MINERALOGICAL ABSTRACTS

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Notices of Books.

ILSON (A. H.). *Semi-conductors and metals. An introduction to the electron theory of metals.* Cambridge (University Press), 1939, xi+120 pp., 39 figs. Price 7*s.* 6*d.*

One of a series of tracts on subjects of physical interest, giving an count of some of the main achievements of the theory of metals in e last ten years. The main topics discussed are the energy levels of three-dimensional crystal, the structure of metals, semi-conductors cluding sections on crystal rectifiers and photoelectric effects), the rmal and magnetic properties of metals, and conductivity. It is not t possible to calculate accurately the small difference in energy con- ts of metal structures and so predict the crystal structure of a metal. far only the properties of metals can be interpreted in terms of the tribution of the energy levels. F. A. B.

AAZ (Franz) & TERTSCH (Hermann). *Geometrische Kristallographie und Kristalloptik und deren Arbeitsmethoden.* Wien (Julius Springer), 1939, ix+215 pp., 260 figs. Price RM. 18·60.

This text-book, intended for use in high schools, is in two parts: crystallography by F. Raaz, and (2) crystal-optics by H. Tertsch. th of these authors have published the results of original work in ese branches. A good general account is given of the subject, and ere are many clear and excellent illustrations. The printing and paper e good, but for a small elementary text-book the price (equivalent about 30*s.*) is excessive. L. J. S.

ARTH (Tom. F. W.), CORRENS (Carl W.), & ESKOLA (Pentti). *Die Entstehung der Gesteine. Ein Lehrbuch der Petrogenese.* Berlin (Julius Springer), 1939, viii+422 pp., 210 figs. Price RM. 30 (bound RM. 33).

Well-known authors in three countries (Norway, Germany, and nland) have contributed to this important treatise on petrogenesis, rock-formation, under the editorship of C. W. Correns. The scientific irit of goodwill and international co-operation is only spoilt by the gh price charged for the volume. Part I (pp. 1–115, 63 figs.) by

T. F. W. Barth deals with the igneous rocks; II (pp. 116–262, 74 fig by C. W. Correns, with sedimentary rocks; and III (pp. 263–407, figs.) by P. Eskola, with metamorphic rocks. General principles of t mode of formation of different types of rocks are discussed in deta with statements of the observations, views, and theories of vario authors, rather than a systematic description of the rocks themselv Selected references are given to the literature and there is a good ind of authors, subjects, and localities, making the book useful for referen There are some strange misprints in the table of contents—Querthos for Anorthosite, Dünste for Dunite, Pyroxerrite for Pyroxenite.

L. J. S.

Du Toit (Alex. L.). *The Geology of South Africa.* 2nd edition, Ed burgh and London (Oliver & Boyd), 1939, xii+539 pp., 41 pl col. geol. map (scale 1 : 500,000), 68 text-figs. Price 28*s.*

The revised edition of this standard work shows an increase of pages on the first edition of 1926. Recent work and literature ha necessitated the rewriting of much of the text, and the geological m has been largely redrawn. In addition to chapters on the several ge logical systems, there are separate chapters on the Bushveld igneo complex, the Karroo dolerites, the volcanic pipes of kimberlite a melilite-basalt (probably of late Cretaceous age), soils, and econon geology (asbestos, corundum, diamond, gold, manganese, platinu tin, vanadium, &c.). The concluding chapter gives a useful summary the geological history of South Africa. A well-written and attract volume. The clear geological map (56+46 cm.; extending to the Za bezi, latitude 16° S.) may be had separately (price 3*s.* 6*d.*, mount 4*s.* 6*d.*).

L. J. S

Lumsden (J.). *Magnesium, magnesite, and dolomite.* Reports on t mineral industry of the British Empire and foreign countri Mineral Resources Dept., Imperial Institute, London, 1939, 126 Price 2*s.* 6*d.*

Since the publication of the first edition of 'Magnesite' [M.A. 1– by the Imperial Mineral Resources Bureau in 1920, there has beer rapid development in the use of magnesium alloys, and the pres edition is just three times the size of the former one. Details are giv of the various uses and processes of manufacture of magnesium co pounds for refractories, cements, &c., with particulars of occurre and statistics of production in various counties. Minerals mentio are magnesite, breunnerite, dolomite, hydromagnesite, brucite, epso

, kieserite, bischofite, carnallite, and tachhydrite; and there are ormous reserves of material in dolomitic limestone. A useful classified bliography of twenty pages is added. L. J. S.

New Minerals.

WLEY (H.). *Simpsonite (sp. nov.) from Tabba Tabba, Western Australia.* Journ. Roy. Soc. Western Australia, 1939, vol. 25 (for 1938–39), pp. 89–92, 2 figs.

YLOR (L. E. R.). *X-ray studies of simpsonite.* Ibid., pp. 93–97, 3 figs.

Tabular hexagonal crystals with rough and dull, cream-coloured surces (*c m*) occur in quartz-biotite-pegmatite. Sections show a core of ourless, optically uniaxial material (simpsonite) with *n* 2·06 and efringence about 0·1, positive, veined with alteration products conting of colourless isotropic material and white opaque granular aterial with some muscovite and quartz. Analyses by D. G. Murray nd J. N. A. Grace) gave Ta_2O_5 72·31 (71·48), Nb_2O_5 0·33 (0·32), Al_2O_3 ·75 (18·64), Fe_2O_3 0·14 (0·48), FeO 0·16 (0·44), MnO 0·08 (0·04), O 3·40 (3·19), Na_2O 1·16 (0·68), K_2O 0·24 (0·42), SnO_2 2·00 (1·19), O 0·42 (nil), SiO_2 1·78 (2·34), F 0·21 (0·38), H_2O+ 1·35 (1·39), H_2O- 0 (0·03) = 100·53 (101·02), sp. gr. 6·525 (6·27). Other partial analyses ve F 0·81–0·89. Deducting microlite, muscovite, and quartz, these alyses give the formula $CaO.5Al_2O_3.4Ta_2O_5.2H_2O$.

Laue photographs through sections parallel to the base and prism dicate the hexagonal bipyramidal [apatite] class. Spacing on the sal plane 4·5 Å., on a prism face 6·2 Å. L. J. S.

ALACHE (Charles) & JARRELL (O. W.). *Salesite, a new mineral from Chuquicamata, Chile.* Amer. Min., 1939, vol. 24, pp. 388–392, 2 figs.

The single small specimen shows bluish-green orthorhombic crystals prismatic habit; $a : b : c = 0·4442 : 1 : 0·6241$, forms *c*(001), *b*(010), 130), *m*(110), *e*(023), *d*(011), *p*(111), *r*(552)? Cleavage (110) perfect, . gr. 4·77, H. 3; α (= *a*, colourless) 1·786, β (= *c*, light bluish-green) 070, γ (= *b*, bluish-green) 2·075, 2V 0–5°, uniaxial for blue, $r > v$, gative. Analysis by F. A. Gonyer, I_2O_5 64·79, CuO 30·62, Na_2O 59, H_2O 3·68 = 99·68, gives $CuIO_3(OH)$. X-ray measurements by . E. Richmond give a unit cell, *a* 4·78, *b* 10·77, *c* 6·70 Å., containing ur molecules; space-group $D_{2h}^{16} = Pcmn$. Artificially prepared $IIO_3(OH)$ is orthorhombic but with pinakoidal cleavage and different tical characters, and it must be regarded as dimorphous with lesite. L. J. S.

Fahey (Joseph J.). *Shortite, a new carbonate of sodium and calciu*
Amer. Min., 1939, vol. 24, pp. 514–518, 2 figs.

This was found in the Eocene clay and oil-shale of deep-bore cor from near Green River, Sweetwater Co., Wyoming. The crystals a hemimorphic orthorhombic and strongly pyroelectric. They are bounde essentially by only five faces (one basal plane, a dome (011), and t macropinakoid); $a : b : c = 0{\cdot}455 : 1 : 0{\cdot}648$. Sp. gr. 2·629, H. 3, α (= 1·531, β (= a) 1·555, γ (= b) 1·570. Analyses gave CO_2 42·90 (42·78 CaO 36·34 (36·38), MgO 0·04 (0·04), Na_2O 19·91 (20·07), insol. 0·6 (0·68), total 99·85 (99·95), agreeing with $Na_2CO_3.2CaCO_3$. The miner is decomposed by water, leaving a residue of $CaCO_3$. Other parts of t cores consist of nearly pure trona. L. J. S.

Efremov (N. E.). *Classification of the minerals of the serpentine grou*
Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 22, p 432–435.

A white to yellowish, compact to fibrous mineral, named *kolskit* occurs as veins in olivinite at Saig lake, Kola peninsula. Under t microscope it shows a scaly structure with extinction parallel to cleavage; biaxial, positive, β 1·542, birefringence up to 0·01; sp. g 2·401, H. 2–3. The thermal curve and X-ray pattern are both of t serpentine type. Analysis by T. M. Jakovleva, SiO_2 43·78, Al_2O_3 0·5 Fe_2O_3 1·17, FeO nil, NiO 0·11, MnO trace, MgO 37·01, CaO 0·41, C 0·56, H_2O+ 13·04, H_2O- 3·02, total 99·66, gives a formula $5MgO$ $4SiO_2.4H_2O$, intermediate between those of deweylite ($4MgO.3SiO$ $6H_2O$) and karachaite ($MgO.SiO_2.H_2O$) [M.A. 7–9]. The serpenti series extends from hydroforsterite ($2MgO.SiO_2.nH_2O$) [M.A. 7–22 to karachaite (and cerolite). A suggested replacement $3MgO \rightleftharpoons Al_2O$ gives a series of analogous 'sialite' minerals (beidellite, saponite, &c.) L. J. S.

Dulhunty (J. A.). *The torbanites of New South Wales. Part I. T essential constituents and their relations to the physical properti*
Journ. Roy. Soc. New South Wales, 1939, vol. 72, pp. 179–19 2 pls., 1 text-fig.

The constituents distinguished microscopically are: Gelosite, as tran lucent, pale yellow, squashed spheres, d 0·95–1·05, H. $2\frac{3}{4}$, n 1·536–1·55 birefringent. Retinosite, translucent orange-red disks, d 1·02–1·0 n 1·545–1·558, birefringent. Humosite, translucent, dark brownish-re d 1·15–1·25, n 1·600–1·625, isotropic. Matrosite, opaque, black, formi

e groundmass, $d > 1{\cdot}45$. Some jet is also present, and secondary alcedonic silica in part replaces the gelosite. L. J. S.

Meteorites and Tektites.

ERLIN (Axel). *On the origin of comets.* Festskrift Ö. Bergstrand, 1936, pp. 107–123, 1 fig.

— *On the building up of larger bodies from small particles in interstellar space.* Zeits. Astrophysik, 1939, vol. 18, pp. 1–24, 4 figs.

Further speculations on the origin of meteorites. [M.A. **7**–171.] L. J. S.

EONARD] (F. C.). *The words aërolite, ethaërial, and Widmanstätten.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, p. 328.

The spellings airolite, ethrial [M.A. **7**–267], and Widmanstetten are ggested. L. J. S.

ONARD (Frederick C.). *Recording the time and place of fall and the designation of meteorites.* Popular Astronomy, Northfield, Minnesota, 1938, vol. 46, pp. 581–582; reprinted in Contributions of the Society for Research on Meteorites, 1938, vol. 2, no. 1, p. 64.

The date and Greenwich Civil Time (G.C.T. or World Time) should recorded for witnessed falls. Falls should be named after the nearest st office, or, if none within several miles, after the 'smallest political bdivision', stating county, &c., latitude and longitude. If more than e fall occurs at one place, they should be numbered chronologically d the year added. L. J. S.

INGER (H. H.). *Subsoil meteorites.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, p. 157. (Abstract.)

Of 60 falls, all of more than 14 lb. penetrated beyond plough-depth, less landing on rock or frozen ground. For stones of average weight lb. the average depth is 20 in., for 56 lb. 24 in., 150 lb. 49 in., and for 2 lb. 133 in. The amount of meteoritic material buried in the subsoil estimated at $9\frac{1}{2}$ million tons for the whole world. L. J. S.

ATSON (Fletcher G., *Jr.*). *The mean chemical composition of meteorite accretion.* Journ. Geol. Chicago, 1939, vol. 47, pp. 426–430.

Estimates of the relative amounts of metallic and stony meteorites ve ranged from 2 : 1 to 1 : 4. From the average composition of the o kinds the average for the whole is calculated for these ratios and so for 1 : 1 and 1 : 2. L. J. S.

La Paz (Lincoln). *Criteria for estimating the population of a meteorit shower.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 4 p. 277. (Abstract.)

The varying estimates of the number of stones in the Pultusk show [M.A. **7**–63] are considered with the aid of the theory of probabilities L. J. S.

La Paz (Lincoln). *The age of the Pultusk, Poland, stones,* Popul Astronomy, Northfield, Minnesota, 1939, vol. 47, p. 277. (Abstract

The age of the Pultusk stones deduced by F. A. Paneth (1932) 5×10^8 years is compatible with the theory of A. Corlin. [M.A. **7**–171 L. J. S.

Volarovich (M. P.) & Leontieva (A. A.). *An investigation into t viscosity of meteorites.* Compt. Rend. (Doklady) Acad. Sci. URS 1939, vol. 22, pp. 589–591.

Moldavite (*d* 2·387, softening begins about 1100°) and tektite fro Indo-China (*d* 2·309, softening 1070°) were cut as rods and their exte sion measured when suspended with a weight in a furnace. The Sarato meteorite, powdered and freed from metal, (m.p. about 1320°), w tested by the ball impact method. The viscosities at 950–1410° l between those of silica-glass and ordinary glass, increasing with th amount of silica. [M.A. **7**–34, 244, 297.] L. J. S.

Bradley (A. J.). *Structure of meteorites.* Nature, London, 1939, vol. 14 pp. 518–519, 1 fig.

A new equilibrium diagram is given for Ni–Fe alloys. Mixtures α and γ phases are in equilibrium only between 350° and 580° C., an the change is very slow, especially below 350° C. For the growth of lar crystals of kamacite and taenite in meteoritic irons it is suggested th the material was subjected to repeated heat-treatment when neari the sun in a cometary orbit, followed by sudden cooling below 350° [M.A. **7**–384.] L. J. S.

Mehl (Robert F.) & Derge (Gerhard). *Studies upon the Widmanstätt Structure, VIII—The gamma-alpha transformation in iron-nick alloys.* Metals Technology (Amer. Inst. Min. Met. Eng.), 193 vol. 4, techn. publ. no. 797, 15 pp., 12 figs.

A slice of the Canyon Diablo meteoritic iron was examined by t Laue method, and it was found that the kamacite lamellae are orient with a (110) plane and a [111] axis parallel to a (111) plane and a [1 axis respectively of the taenite. The same orientation holds for nick

n alloys with 27 and 31 % Ni in which the α-phase (kamacite) is de-
pped by annealing at 250° C., but when the α-phase is developed by
ling at −195° C., the kamacite has a (110) plane and a [110] axis
allel to a (111) plane and a [211] axis of the γ-phase; with trans-
mation at −70° C. intermediate orientations appear to occur. Alloys
taining < 27 % Ni could not be retained wholly in the γ-phase at
m-temperature, while those with > 34 % Ni could not be transformed
the α-phase within reasonable time at any temperature. [M.A. **5**–152,
53.] M. H. H.

ARD (Robert M.). *Widmanstätten figures in terrestrial alloys.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 324–328, 1 fig.

Kamacite is a solid solution of nickel in iron, taenite a solid solution iron in nickel, and plessite a eutectoid of the two. A review is given the literature [M.A. **6**–191 overlooked] on the native iron in basalt m Ovifak, Greenland. Lamellar octahedral intergrowths have been corded in alloys of various kinds. L. J. S.

DDHUE (John Davis). *Taenite.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 273–276, 1 fig.

The taenite bands in several octahedrites consist of lighter outer nds of orthotaenite (Fe_2Ni) and a dark central band of metataenite fine plessite-like intergrowth of orthotaenite and kamacite) [M.A. **6**–00]. In some cases the composite bands can be split up: in the Canyon ablo siderite the thickness of the central band was measured as 025 mm., and the side bands each 0·013 mm. [Cf. Min. Mag. **22**, pl. xx, s. 7, 10, 11.] L. J. S.

DDHUE (John Davis). *Fused meteoritic iron: second paper.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 387–389. [M.A. **7**–64.]

A piece of the Henbury (Central Australia) siderite after fusion showed fine granular structure, the grains probably having nickel-rich bound-ies. Canyon Diablo also showed a granular structure, except where e presence of schreibersite produced a pearlite-like structure with a artensite-like structure at the edges. Another piece of Canyon Diablo sed on charcoal showed, in part, grains of ferrite enclosed in cementite; e remainder showed a dendritic structure. L. J. S.

RINOV (E. L.). *Fall of the stony meteorite Zhovtnevy.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 22, pp. 436–438, 2 figs.

A bolide was seen and noises heard at 2 a.m. on October 9, 1938, and

fragments of four stones were found near the Zhovtnevy farm, Stal district, Ukraine (47° 35′ N., 37° 15′ E.) The largest, about 32 kg penetrated to a depth of 70 cm. in a cornfield. Fragments with a tot weight of 30,741 grams have been recovered. The stone is a friable gre chondrite with large chondrules and inclusions of nickel-iron an troilite. L. J. S.

[Dravert (P. L.)] Драверт (П.). Метеорит «Новорыбинское» Казахстана. [*Meteorite 'Novorybinskoe' from Kazakhstan.*] Приро [Priroda, Acad. Sci. USSR], 1939, no. 2, p. 123.

The meteorite fell, probably in 1927, at Novorybinskoe (51° 53′ N 71° 15′ E.) north of Akmolinsk, and was dug up by local peasants. Th original weight was 3055 grams, and the present weight 3045½ gram sp. gr. 7·725. It shows a well-developed octahedral shape with destroye frontal surfaces and a thin reddish-brown slaggy crust. Inclusions troilite and droplets of lawrencite are seen on fresh surfaces. Polishe and etched surfaces show Widmanstetter figures, and qualitative tes showed the presence of nickel and cobalt. S. I. T.

[Dravert (P. L.)] Драверт (П.). Железный метеорит «Тюмень 1903 г. [*Iron meteorite 'Tyumen' of 1903.*] Природа [Priroda, Aca Sci. USSR], 1939, no. 2, pp. 123–125.

The fall of a meteorite in April (about 20–22 new style) 1903 wa witnessed by P. A. Rossomachin, then a schoolboy and now directo of the Tyumen museum, West Siberia (57° 10′ N., 65° 32′ E.). He collecte one fragment (about ¾ kg.) which was placed in the museum but wa subsequently lost. S. I. T.

Kulik (L. A.). *Data on the Tungus meteorite as available towards 193* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 22, pp. 51 519, 1 fig.

Recapitulation of previous notes [M.A. **7**–67]. Aerial photograp taken in 1938 show fallen trees radiating from two or four centres explosion. L. J. S.

Nichols (Henry W.). *New meteoritic finds from Wabar, Arabia, a Joe Wright Mountain, Arkansas.* Popular Astronomy, Northfiel Minnesota, 1939, vol. 47, p. 329.

Recent additions to the meteorite collection of the Field Museum Natural History at Chicago include: Two pieces (62·3 grams) of ir and a specimen of silica-glass from Wabar [Min. Mag. **23**–387], collecte

geologists of the Californian Arabian Standard Oil Company. A mass, lb. 10 oz., of the Joe Wright Mountain siderite found in 1938, about miles from the place of the original find. L. J. S.

AUGHTON (S. H.) & PARTRIDGE (F. C.). *The meteorite fall of Macibini, Zululand.* Trans. Geol. Soc. South Africa, 1939, vol. 41 (for 1938), pp. 205–210, 4 pls.

Loud explosions and the fall of stones were heard at about 8 a.m. on ptember 23, 1936, at Macibini near Empangeni [about 28° 50′ S., ° 55′ E.]. Four stones (675·5, 467, 135·6, 15·1 g.) complete with shining ack crust and two broken stones (595·8, 106·4 g.) with secondary crust re recovered [total 2 kg.]. They were hot when picked up. Sp. gr. 89, 3·09, 3·303 for different stones; 3·26 for the crushed material. ie brecciated material is grey with lighter and darker inclusions, and ows broken grains of pyroxene and felspar in a fine-grained ground-ass of the same minerals. The felspar is bytownite-anorthite with 1·572, β 1·579, γ 1·584, 2V 77°. The larger part of the pyroxene is auvish-green pigeonite with α 1·705, β 1·708, γ 1·744, 2V 22–30°, c = 24–39°; and in smaller amount a colourless pyroxene with 1·685, β 1·693, γ 1·702 and larger 2V. Also a few grains of olivine (?). i is an achondrite of the eucrite type. Analysis by C. J. v. d. Walt gave O_2 49·10, TiO_2 0·74, Al_2O_3 11·71, Cr_2O_3 0·42, Fe_2O_3 nil, FeO 16·47, nO 0·51, MgO 8·43, CaO 10·31, Na_2O 0·62, K_2O 0·06, H_2O+ 0·13, O_5 0·09, Fe 1·58, Ni trace, Co nil, S 0·21, C 0·04, rare-earths nil = 00·42. L. J. S.

ININGER (Addie D.). *Second catalog of meteoritic falls reported to the Society for Research on Meteorites: August, 1936, to December, 1938.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 209–214.

An alphabetical list of 82 new meteorites, nos. 101–182, in continuation of the previous list [M.A. **7**–62], giving a few essential particulars ut no references to the literature. Fifteen (14 stones and one mesoderite) were witnessed falls, and in five cases houses were struck. Most f them are finds in the western United States, bringing the totals to: exas 64, Colorado 33, Kansas 44, and Nebraska 23. L. J. S.

ININGER (H. H.). *The Piñon, New Mexico, siderite.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 155–156, 1 fig.

A shapeless mass weighing 17·85 kg. (39¼ lb.) and with little surface ale was received from the State Agricultural College of New Mexico

in 1932 [date when found?]. The locality is given as Tp. 19 S., Rang 18 E., Sect. 22 in Chaves Co. (32° 40′ N., 105° 6′ W.) [i.e. about 20 mile E. by N. of Pinon in Otero Co.]. It is a structureless ataxite with a fe small troilite nodules, and shows on the etched surface a sheen due t the uniform orientation of many minute needles of rhabdite. Analysi by F. G. Hawley gave Fe 82·52, Ni 16·32, Co 0·67, Cu 0·03. Cr 0·01 Mn trace, P 0·402, S 0·102, C 0·03, SiO_2 0·02, O trace = 100·113; P metals 2·52 oz. per ton (0·0084 %). L. J. S.

Leard (Robert M.). *Some properties of the Beenham, New Mexico aërolite.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47 pp. 385–387, 4 figs.

A veined grey chondrite [44 kg.] was found in 1937 near Beenham Union Co. The metallic portion (15–18 %) consists of nickel-iron an troilite in about equal amounts. Enstatite, enstatite-olivine, and olivin chondrules are described. Olivine, which is also present as crystals an grains, has α 1·678, β 1·695, γ 1·716, 2V 85°, corresponding with 2 mol. % Fe_2SiO_4. L. J. S.

Young (David M.). *Three new siderites from Kentucky: Campbellsville Clark County, and Providence.* Popular Astronomy, Northfield Minnesota, 1939, vol. 47, pp. 382–385, 3 figs.

The following are added to the list of 16 meteorites previously know from Kentucky. *Campbellsville.*—A mass of 15·422 kg. was ploughed u in 1929 near Campbellsville, Taylor Co. It is a coarse octahedrite an gave on analysis by J. C. McHargue Fe 88·99, Ni 10·27, Co 0·26, Cu Mn, Ti, C, S traces. *Clark County.*—A mass of 26 lb. was found in 193 in the southern part of the county. *Providence.*—A mass of 6·804 k found in 1903 on the surface 1 mile SW. of Providence, Trimble C It is a coarse octahedrite with Fe 88·54, Ni 10·30, Co 0·30, Cu 0·0 Mn, Ti traces. L. J. S.

Nininger (H. H.). *The Monahans, Texas, meteorite.* Popular Astr nomy, Northfield, Minnesota, 1939, vol. 47, pp. 268–271, 3 figs.

Digging out an iron-stained patch in sandy ground near Monahan Ward Co. (31° 50′ N., 102° 55′ W.), in 1938, a 65 lb. mass of iron wit a thick crust of scale was found at a depth of one foot. Polished an etched sections are dull but with bright reflections, and under a le a network of spindles of kamacite and prominent ridges of taeni (about half the width of the kamacite) is seen. The structure shows r regularity, and the iron seems to be intermediate between a nickel-ri

xite and a finest octahedrite. Small troilites sometimes show four-six-sided sections. When grinding some sections the carborundum th was quickly worn through, suggesting the presence of diamond. alysis by F. G. Hawley gave Fe 88·30, Ni 10·88, Co 0·63, Cu 0·69, 0·021, Mn trace, P 0·093, S 0·047, C trace, Si 0·01 = 100·67.

L. J. S.

DDHUE (John Davis). *The oxide of the Monahans, Texas, meteorite.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 271–273.

The rust is compact to lamellar, strongly magnetic, and with sp. gr. 85, 3·70, 4·20 in different pieces. Small specks of remnant metal are wn by treating a polished surface with copper sulphate solution; se show threads of taenite extending into the oxide. Green stains are erred to zaratite. Analysis by G. D. Van Arsdale gave Fe_2O_3 69·53, O 14·99, NiO 4·55, H_2O (110°) 0·58, H_2O (ign.) 7·04, insol. 1·14 = 83. L. J. S.

LLARD (Fred M.). *The Rosebud meteorite, Milam County, Texas.* Amer. Min., 1939, vol. 24, pp. 184 (abstract), 242–254, 15 figs.

This stone, weighing 54·9 kg. (121¼ lb.), was ploughed up about 1907 1½ miles W. of Burlington in Milam Co. and 6 miles S. of Rosebud in lls Co. [31° N., 97° W.]. It is low-conical with oval-shaped pits diating from the smooth apex, and broad pits and blebby crust on lat base. Sp. gr. 3·59. It is classed as a black chondrite, showing ondrules of various types, and consists mainly of olivine with orthombic pyroxenes (optically positive enstatite and negative hypersene), metal, troilite, glass, and chromite. Analysis by F. A. Gonyer the soluble and insoluble silicates and metallic portion give the bulk mposition SiO_2 34·28, Al_2O_3 3·53, Cr_2O_3 0·14, FeO 18·79, NiO 0·14, O trace, MnO 0·15, MgO 23·77, CaO 1·80, Na_2O 0·41, K_2O 0·06, P_2O_5 09, H_2O 0·07, FeS 3·42, Fe 12·15, Ni 1·15, Co 0·05, Cu trace, P 0·003 – 0·003. Spectrographic analyses showed also Ge in the metallic portion, in the insoluble silicates, and Ba in the soluble silicates. L. J. S.

OSHAG (W. F.). *Petrology of the Shallowater meteorite.* Amer. Min., 1939, vol. 24, p. 185 (abstract).

This meteorite was found in 1936 near Shallowater, Lubbock Co., exas. It is a very coarse-grained diogenite with enstatite 83½, forsterite oligoclase ($Ab_{83}An_{17}$) 1½, nickel-iron and troilite 10%. The silicates e poor in iron (enstatite 4% FeO). L. J. S.

Monnig (Oscar E.). *Kendleton Texas meteorites.* The Sky, Amer. Mu
Nat. Hist., 1939, vol. 3, no. 10, pp. 6–7, 24, 3 figs.

A fireball was seen in SE. Texas at 7.25 p.m. on May 2, 1939, first
a height of 80 miles and ending at 16 miles, the path of 95 miles bei
traversed in $3\frac{1}{2}$ seconds. Photographs are given of the luminous tr
which persisted for 5 minutes (traces seen after 15 minutes). Explosio
were heard and after an interval thumps were heard on the ground
Kendleton, Fort Bend Co. Over an area of several square miles 13 ston
with a total weight of 6937 grams ($15\frac{1}{4}$ lb.) were found, the large
$3\frac{1}{2}$ lb. The meteorite is a brecciated grey chondrite with darker patch
and slickensides. Troilite and metal are present. L. J. S.

Perry (Stuart H.). *The Salina (Utah) meteorite.* Popular Astronom
Northfield, Minnesota, 1939, vol. 47, pp. 121–124, 3 figs.

Fragments of an almost completely weathered siderite were found
1908 in the Pahvant Mts., 15 miles from Salina, [Sevier Co.]. Only o
piece of 235 grams has been preserved. A polished surface of the ir
oxide shows a banded structure, suggesting a coarse octahedrite, wit
minute specks of kamacite, taenite, and schreibersite as remnants.
L. J. S.

Perry (Stuart H.). *The Seneca Township meteorite.* Popular Astr
nomy, Northfield, Minnesota, 1939, vol. 47, pp. 183–193, 16 figs.

This siderite [M.A. **3**–536] was seen to fall in June 1903 (?) in Lanaw
Co., Michigan, but was not found until July 1923. It is a lenticul
mass 24×19 cm. with a maximum thickness of 8 cm.; weight 11·5 k
The rounded front is pitted, and less so the flat back. Details are give
of the microscopic structure, and the meteorite is classed as a fine
octahedrite. An external zone of alteration about 5 mm. wide is n
very conspicuous at the flat surface; it shows small areas of kam
cite that have undergone a dendritic recrystallization and been invade
by magnetite. One of the small troilite inclusions shows a hexagon
outline in section. L. J. S.

Perry (Stuart H.). *The Wood's Mountain (N.C.) meteorite.* Ame
Journ. Sci., 1939, vol. 237, pp. 569–574, 6 pls.

This siderite (previously listed as 'McDowell County, found 1923
was found in 1918 in a stream near Wood's Mountain, McDowell Co.
weighed 3017 grams and has the form of a low cone with flat base an
a weathered surface. The structure is that of a finest octahedrite, bu
the kamacite bands (0·15–0·18 mm. wide) are mostly wavy and comple
and they show a coarse granulation. Taenite shows up well on a portio

he polished surface where the kamacite has been altered to limonite. external zone (3–5 mm. wide) of alteration shows intrusions of mag- ite surrounding minute areas of iron which has recrystallized with endritic structure. This zone is seen only at the flat (rear) surface, ere presumably there was a thicker accumulation of fused material ring the flight of the meteorite. Analysis by F. A. Gonyer, Fe 91·14, 8·27, Co 0·34, Cu 0·02, S 0·03, P 0·02, insol. (oxide) 0·16 = 99·98, ows Ni and P rather lower than usual for a finest octahedrite.

L. J. S.

CHOLS (H. W.). *The Benld meteorite.* Scientific Monthly (Amer. Assoc. Adv. Sci.), 1939, vol. 49, pp. 135–144, 6 figs.

This stone [M.A. **7**–273] is now in the Field Museum of Natural story at Chicago, together with the damaged portions of the garage of and of the motor-car. It is provisionally classed as a veined grey ondrite. This is the eleventh recorded case in which a meteorite has uck a building.

L. J. S.

ONARD (Frederick C.). *The Goose Lake siderite: California's largest known meteorite.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 322–324, 2 figs.

This mass, 117 × 73 × 51 cm., 1167 kg. (2573 lb.), was found in October 38 near Goose Lake, Modoc Co. (41° 58·6′ N., 120° 32·5′ E.), resting a saucer-like depression 5 feet in diameter and 1 foot deep. The face is weathered and wind-polished. A polished and etched surface ows the structure of a medium octahedrite. As the mass was found the Modoc National Forest it becomes the property of the United ates National Museum.

L. J. S.

IVNY (Viktor). *A legnagyobb ismert meteorkő.* [The largest known meteoritic stone.] Pótfüzetek a Természettudományi Közlönyhöz [Supplement to Természett. Köz. Budapest], 1938, vol. 70, pp. 127–130, 1 fig.

An account is given from the literature [M.A. **5**–11, **7**–68] of the ragould (Arkansas) meteorite, with comparison to other large stones.

L. J. S.

UETT (J. Hugh). *The Willamette, Oregon, meteorite in history.* Popular Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 148–150.

An account is given of the finding (in 1902) and removal of this erite (> 31,000 lb.) and of the ensuing lawsuit. It was presented to e American Museum of Natural History, New York, in 1906.

L. J. S.

Pruett (J. Hugh). *The "Tree meteorite" of La Pine, Oregon.* Popul Astronomy, Northfield, Minnesota, 1939, vol. 47, pp. 150–151.

Pseudo-meteorites consisting of clinkers of fused wood-ash have be found in hollow tree trunks after forest fires. L. J. S.

Monnig (Oscar E.). *How the Casas Grandes, Chihuahua, Mexic meteorite got to Washington, D.C.* Popular Astronomy, Northfiel Minnesota, 1939, vol. 47, pp. 152–154.

An account is given of the various ownership claims on this sideri (3407 lb.), which had been found in temple ruins, and its eventual gi to the United States National Museum, Washington, D.C. L. J. S.

Hodge-Smith (T.). *Australian meteorites.* Mem. Australian Mus., 193 no. 7, ii + 84 pp., 19 pls., 5 text-figs.

This catalogue gives particulars of the 84 authenticated Australia meteorites and of a few others that are doubtful, with special referen to the collection in the Australian Museum at Sydney. It includes general account of meteorites, meteorite craters, and tektites. A bibli graphy of 219 items is divided into sections: Australian meteorite catalogues of collections, meteorites in general, and tektites.

L. J. S.

James (C. G.). *The problem of the lunar craters.* Discovery, Cambridg 1938, n. ser., vol. 1, pp. 157–164, 4 figs.

The various theories, including that of exploding meteorites [M. 7–76], are mentioned. Similar forms are seen on the surface of weld steel. L. J. S.

Fenner (Charles). *Blackfellows' buttons: the remarkable glass meteorit of Australia.* The Sky, Amer. Mus. Nat. Hist., 1939, vol. 3, no. pp. 16–17, 27, 5 figs.

A popular article on australites. L. J. S.

Michel (H.). *Tektite.* Fortschr. Min. Krist. Petr., 1939. vol. 2 pp. cxliii–cxlv.

A general review of natural glasses. The Colombian glasses [M. 3–538] are classed as obsidian; those from Paucartambo [M.A. 6–40 the Libyan Desert, and from meteorite craters must be considered apa from tektites. The Darwin glass from Tasmania is classed with gla from meteorite craters. True tektites are found in deposits of differe geological ages (Miocene and Pleistocene), and only a theory of mete ritic origin can hold. The material may have entered the earth

mosphere as glass from a glass sea on some other celestial body, or light metals which on oxidation in the earth's atmosphere produced ss [M.A. **3**–97, **5**–303]. L. J. S.

IDE (F.). *Über Tektite von Java.* Zentr. Min., Abt. A, 1939, pp. 199–206, 8 figs.

Two 'tektites' from Java described by R. D. M. Verbeek in 1897 are ubtful. A description is given of the tektites from Solo, central Java .A. **6**–403, **7**–78]. These are black and corroded, in thin splinters own and streaky with few air bubbles; d_4^{20} 2·436 for analysed material 431 and 2·452 in others), n_{Na} 1·5091. Analysis by P. Wagner gave O_2 73·73, TiO_2 0·87, Al_2O_3 11·33, Fe_2O_3 0·83, FeO 4·46, MnO 0·11, $_2O$ 2·39, CaO 2·49, Na_2O 1·15, K_2O 2·32, P_2O_5 0·19, H_2O+ 0·25, $_2O-$ 0·06 = 100·18. Spectroscopic analysis gave NiO 0·026, Cr_2O_3 047 %, in the same amounts and ratio (Cr : Ni = 1·6) as in tektites m Billiton, Borneo, and southern Indo-China [M.A. **7**–276].

L. J. S.

PSON (Edward S.). *A second australite observed to fall in Western Australia.* Journ. Roy. Soc. Western Australia, 1939, vol. 25 (for 1938–39), pp. 99–101, 3 figs.

In 1935 a thud was heard and a cloud of dust seen on a gravel tennis urt at Cottesloe near Perth, and at a depth of 15 inches in sandy soil stone, still too hot to hold, was dug up. It weighed 156 grams, sp. gr. 42, and consists of black glass. The form is lenticular (57 × 55 mm. nd 39 mm. thick) with surface markings of wrinkles and grooves. A otograph is also given of the australite which fell at Lake Grace in 933 [M.A. **6**–106]. L. J. S.

X-rays and Crystal-structure.

ATTERGOOD (Allen). *The making of crystal lattice and unit cell models.* Journ. Chem. Education (Amer. Chem. Soc.), 1937, vol. 14, p. 140, 2 figs.

EYMOUR (Keith M.). *A simple method of crystal model construction.* Ibid., 1938, vol. 14, pp. 192–194, 5 figs.

Contact models of crystal-structures are made from (1) glass marbles, 2) sponge-rubber balls. Distanced models (2) are made from sponge-ubber balls and oak dowelling rod. M. H. H.

Crystal symmetry. An introduction to modern knowledge of inorgan crystal structures. London, British Museum (Natural History), 193 vi+21 pp., 2 pls., 3 text-figs. Price 6*d*.

This pamphlet, written by F. A. Bannister, explains clearly in popul language an exhibition of a series of crystal-structure models of son common minerals. The several types of silicate patterns are brief explained. L. J. S.

Mehmel (Martin). *Datensammlung zum Mineralbestimmen mit Rön genstrahlen. Teil I.* Fortschr. Min. Krist. Petr., 1939, vol. 2 pp. 91–118.

In this part data from X-ray photographs are tabulated for th determination of 17 minerals (including clay minerals) of importan in sedimentary petrography. L. J. S.

Cavinato (Antonio). *Una elementare dimostrazione della identità tra equazioni del Laue e la relazione del Bragg.* Zeits. Krist., 1939, vo 100, pp. 439–440, 1 fig.

An elementary proof of the formulae connecting the directions incident and diffracted X-rays. H. S.

Aminoff (G.) & Broomé (B.). *Användning av elektronstrålning v studiet av kristaller.* Svenska Fysikersamfundets publikation Ko mos, 1938, vol. 16, pp. 167–198, 23 figs.

A general account of the method of electron diffraction for the stud of crystals, with illustrations of the apparatus used. [M.A. **6**–78, 16 330; **7**–230.] L. J. S.

Hámos (L. v.). *Formation of true X-ray images by reflection on cryst mirrors.* Zeits. Krist., 1939, vol. 101, pp. 17–29, 10 figs.

A cylindrical crystalline mirror of suitable internal structure can giv true images by reflection of a linear X-ray source in the sense of ord nary geometrical optics. The image is best when the source is near th axis of the cylinder. The resolving power is limited mainly by chr matic aberration, which can only be reduced by diminishing the radi of the cylinder. H. S.

Murdock (Carleton C.). *The interpretation of Laue photographs in tern of the reciprocal lattice. A correction.* Zeits. Krist., 1939, vol. 10 p. 271.

The advantages of the use of the reciprocal lattice were first pointe out by Ewald, Laue, and Runge in 1913. H. S.

LAUMANIS (M.) & IEVIŅŠ (A.). *Die Drehkristallmethode als Präzisionsverfahren und deren Vergleich mit der Pulvermethode.* Zeits. Physik, 1938, vol. 109, pp. 728–743, 1 fig.

The lattice constant of halite crystals from five different localities is 2735±0·00002 Å. at 18°C. The powder method yields 5·62747± 0003 Å. The difference of the single-crystal and powder measurements is attributed to absorption. Different crystals of more complex stances, e.g. $Co[Hg(CNS)_4]$, yield dimensions differing by 0·008 Å., to differences in chemical composition. Here the powder method lds only average values. F. A. B.

LEJŠEK (V.) & JEŽEK (M.). *Le pouvoir séparateur et la pénétration du rayonnement X dans les cristaux mosaïques.* Compt. Rend. Acad. Sci. Paris, 1938, vol. 207, pp. 985–987.

The widths of the line Cu-K_α were determined under various conditions as to distances between slit, crystal, and photographic plate, ng crystals of SiO_2, NaCl, or ZnS. The results show that, with large ances, the separating power of a mosaic crystal is as good as that perfect one; e.g. that of a crystal of NaCl with distances of 3 m. ween slit and crystal and between crystal and plate is equal to that ne of SiO_2 at distances of 1 m. C. A. S.

ER (J.) & JAHODA (M.). *Le spectromètre à cristal double avec enregistrement photographique et la mesure de l'imperfection des cristaux.* Compt. Rend. Acad. Sci. Paris, 1938, vol. 207, pp. 737–739, 1 fig.

The method differs from the more usual one in which the recording y means of ionization, in that this is effected photographically, and two crystals are fixed in the antiparallel position. Results with Cl, ZnS, and SiO_2 are given. These show constant minimum values the imperfection, due to a characteristic regular mosaic structure, variable maximum values, which indicate a coarser and more accital mosaic structure. C. A. S.

PRÉ LA TOUR (François). *Diffraction des rayons X par une poudre cristalline étendue sur une surface plane immobile.* Compt. Rend. Acad. Sci. Paris, 1939, vol. 209, pp. 51–53.

This method is described with mathematical detail. With a comratively short exposure, about 10 min., it gives a well-defined diagram for example, a fatty acid, and is well suited for examination of ymorphism, dilatation, &c. C. A. S.

A—D d

Preston (G. D.). *Diffraction of X-rays by crystals at elevated tempe tures.* Proc. Roy. Soc. London, Ser. A, 1939, vol. 172, pp. 116–1 5 pls., 5 text-figs.

Laue photographs of aluminium, halite, and periclase show certa diffuse spots which do not belong to the normal pattern. The intensi of these is increased at 500° C. They are attributed to a breaking up ir groups of atoms by the thermal vibrations of the lattice. Diamond sho no diffuse spots and only a very slight difference at 500° C. L. J. S.

Halla (F.) & Weil (R.). *Röntgenographische Untersuchung von "krist lisiertem Bor".* Zeits. Krist., 1939, vol. 101, pp. 435–450, 8 fi

'Crystallized boron' (AlB_{12}) occurs in two modifications. The mo clinic form has a unit cell containing four molecules of AlB_{12} wi a 8·50, b 10·98, c 7·38 Å., β 36° 31′. The tetragonal form has a unit c with a 10·28, c 14·30 Å., and is pseudo-cubic. It is only possible to rec cile observation with theory by assuming that atoms are missing fr many of the lattice points. H. S.

Owen (E. A.) & Yates (E. L.). *X-ray investigations of pure iron-nic alloys. Part 1: Thermal expansion of alloys rich in nickel.* Pr Physical Soc. London, 1937, vol. 49, pp. 17–28, 1 fig.

—— —— *Part 2: Thermal expansion of further alloys.* Ibid., pp. 17 188, 4 figs.

—— —— *Part 3: The thermal expansion of alloys rich in iron.* Ibi pp. 307–314, 1 fig.

—— —— & Sully (A. H.). *Part 4: The variation of lattice-parame with composition.* Ibid., pp. 315–322, 1 fig.

—— —— —— *Part 5: The variation of thermal expansion with com sition.* Ibid., pp. 323–325, 1 fig.

The lattice dimensions of several carefully annealed Fe-Ni allo were determined from X-ray powder photographs at temperatu 15–600° C. At 15°, for the γ phase (face-centred, corresponding taenite) a 3·5171 A. with 100 % Ni, a 3·5733 with 23·4 at. % Ni; for t α phase (body-centred, corresponding to kamacite) a 2·8630 with 2 at. % Ni, a 2·8634 with 8·8 at. % Ni, and a 2·8605 with 100 % [M.A. 7–229.] L. J. S.

Owen (E. A.) & Sully (A. H.). *The equilibrium diagram of iron-nic alloys.* Phil. Mag. London, 1939, ser. 7, vol. 27, pp. 614–6 2 pls., 3 text-figs.

From X-ray data (preceding abstract) the boundaries of the α, $\alpha+$ and γ areas are traced. L. J. S.

RANDENBERGER (E.). *Die Kristallstruktur des Awaruit.* Schweiz. Min. Petr. Mitt., 1939, vol. 19, pp. 285–286.

Grains of awaruite in lherzolite-serpentine from Selva, Poschiavo, Switzerland, gave a face-centred cubic structure with a 3·558 Å. This corresponds with 66 % Ni, near $FeNi_2$, and d 8·46. L. J. S.

DWOTNY (H.) & MOHRNHEIM (A.). *Die Kristallstruktur von Al_2Ca.* Zeits. Krist., 1939, vol. 100, pp. 540–541.

The intermetallic phase Al_2Ca has a cubic unit cell of edge 8·02 Å. containing eight molecules of Al_2Ca. H. S.

VES (F.) & WALLBAUM (H. J.). *Die Kristallstruktur von Ni_3Ti und Si_2Ti. (Zwei neue Typen.)* Zeits. Krist., 1939, vol. 101, pp. 78–93, 4 figs.

An alloy of nickel and titanium has the space-group D_{6h}^4; the unit cell contains one molecule of Ni_3Ti and has a 2·548, c 8·304 Å. An alloy of silicon and titanium has the space-group D_{2h}^{24}; the pseudo-hexagonal unit cell contains one molecule of Si_2Ti and has a 8·236, b 4·773, c 8·523 Å. H. S.

LDOBA (Karl F.) & MACKOWSKY (Marie-Therese). *Über die Isomorphie von Eisen und Zink in der Zinkblende.* Zentr. Min., Abt. A, 1939, pp. 12–21, 3 figs.

V. M. Goldschmidt (1926) [M.A. **3**–326] and H. Ehrenberg (1931) have stated that the entrance of FeS in blende does not affect the lattice constant. Careful measurements give the following results, showing that with increase in iron there is a linear increase in the cell-size.

Locality.	Colour.	Fe%.	a.
Santander, Spain	colourless	0·16	5·412 Å.
Alston, Cumberland	brown-black	10·31	5·4213
Breitenbrunn, Saxony	black	18·25	5·431
St. Agnes, Cornwall	black	26·2	5·439

Since, according to Goldschmidt, the atomic radius of iron (1·26 Å.) is less than that of zinc (1·33 Å.) this result is surprising. An explanation is attempted by assuming that the FeS is present as pyrrhotine; but published analyses of blende show no regularity in the excess or deficiency of sulphur with the percentage of iron. L. J. S.

TELAAR (J. A. A.) & GORTER (E. W.). *Die Kristallstruktur von Thallosulfid (Tl_2S).* Zeits. Krist., 1939, vol. 101, pp. 367–375, 2 figs.

Thallium sulphide has the space-group C_3^4. The hexagonal unit cell contains 27 molecules of Tl_2S and has a 12·20, c 18·17 Å. H. S.

Ketelaar (J. A. A.), Hart (W. H. t'), Moerel (M.), & Polder (D.) *The crystal structure of TlSe, thallous thallic or thallosic selenid* Zeits. Krist., 1939, vol. 101, pp. 396–405, 1 fig.

Thallium selenide has the space-group D_{4h}^{18}. The unit cell contain eight molecules of TlSe and has a 8·02, c 7·00 Å. H. S.

Lange (Paul W.). *Ein Vergleich zwischen Bi_2Te_3 und Bi_2Te_2S.* Natu wissenschaften, 1939, vol. 27, pp. 133–134.

The compound Bi_2Te_3 has unit-cell dimensions a 10·45 Å., α 24° 8 and space-group $D_{3d}^5 = R\bar{3}m$. Although the crystal-structures Bi_2Te_3 and tetradymite (Bi_2Te_2S) are very similar, powder photograph of intermediate compounds show the presence of both phases.

F. A. B.

Hiller (J.-E.). *Zur Kristallstruktur des Valleriits.* Zeits. Krist., 193 vol. 101, pp. 425–434, 2 figs.

Valleriite has probably the space-group D_{2h}^5. The unit cell contain two molecules of $Cu_2Fe_4S_7$ (perhaps $Cu_3Fe_4S_7$) and has a 6·13, b 9·8 c 11·40 Å. H. S.

Wolfe (C. W.). *Cannizzarite and bismuthinite from Vulcano.* Ame Min., 1938, vol. 23, pp. 790–798, 2 figs.

Minute plates of cannizzarite from Vulcano, Lipari Islands, yiel axial ratios $a : b : c = 0{\cdot}8050 : 1 : 0{\cdot}2828$, in close agreement with valu calculated from the unit-cell dimensions a 11·73, b 14·47, c 4·076 Å. new chemical analysis on material with specific gravity 4·80 giv S 17·16, Pb 31·33, Bi 51·25, Sb 0·19, Fe 0·27, total 100·20, yieldi $Pb_3Bi_5S_{11}$ as the unit-cell contents and calculated specific gravity 4·8 The space-group is given as $D_{2h}^{16} = Pnam$ [but the list of halvings compatible only with $C_{2v}^9 = Pna$]. Forms present are a(100), m(110 w(011), Q(210), y(180), d(201), p(111), G(211), h(140), S(410), an x(031), &c.; a good cleavage (110) is present and the hardness is 2–. Goniometric and X-ray data suggest the identity of bismutoplagioni [M.A. 1–75, 151] with cannizzarite. Acicular prisms on two specime labelled as cannizzarite from Vulcano were found to be well-terminate bismuthinite. Crystals with specific gravity 6·46 gave on chemic analysis S 19·48, Bi 80·29, Fe 0·38, total 100·15; the specific gravit calculated from Hofmann's unit-cell measurements [M.A. 5–46 is, however, 6·81. Goniometric data yield the elements $a : b : c$ = 0·9820 : 1 : 1·0548, and new forms (180), (3.10.0), (370), (470), (10.7.0 (730), (20.7.0), (610), (10.1.0), (12.1.0), (023), (504), (904), (502), (601 (377), w(121), (955), (16.3.6), (12.1.2), and (631). F. A. B.

OFMANN (Wilhelm). *Die Struktur von Miargyrit $AgSbS_2$.* Sitzungsber. Preuss. Akad. Wiss., Phys.-math. Kl., 1938, pp. 111–119, 6 figs. Abstract, ibid., p. 55.

Miargyrite from Bräunsdorf, Saxony, has a unit cell, *a* 13·17, *b* 4·39, 12·83 A., β 81° 22½′, containing $8AgSbS_2$; space-group C_{2h}^6, and the ructure is pseudo-tetragonal. Metal and sulphur atoms are all in tahedral co-ordination, as with matildite and aramayoite. L. J. S.

LACHE (Charles). *Crystallographic studies of sulphosalts: baumhauerite, meneghinite, jordanite, diaphorite, freieslebenite.* With X-ray studies by W. E. Richmond and Horace Winchell. Amer. Min., 1938, vol. 23, pp. 821–836.

New goniometric data, angle tables, and X-ray data are given. A pographical error in Solly's original axial ratios for baumhauerite is inted out. These should be $a : b : c = 1{\cdot}3687 : 1 : 0{\cdot}9742$, β 82° 43′. nit-cell dimensions for meneghinite are *a* 11·29, *b* 23·78, *c* 4·12 Å.; the mmetry is orthorhombic and the cell contents are $Pb_{13}Sb_7S_{23}$, yielding lculated specific gravity 6·391. Two poor cleavages are observed, 10) and (001). Two new forms (0.24.11) and (7.21.1) are noted as ditions to the 'aberrant' forms, i.e. forms with complex indices eviously observed for this mineral. Unit-cell dimensions for jordanite *a* 7·529, *b* 31·87, *c* 4·421 Å., β 86° 1′, specific gravity 6·32, and cell ntents $Pb_{14}As_7S_{24}$ or $Pb_{13}As_7S_{23}$. Diaphorite has unit-cell dimensions 15·83, *b* 32·23, *c* 5·89 A., specific gravity 5·97, and cell contents $Ag_3Pb_2Sb_3S_8$; the space-group is $D_{2h}^{21} - Cmma$. Freieslebenite has unit-ll dimensions *a* 7·53, *b* 12·79, *c* 5·88 Å., β 87° 46′, specific gravity 6·20, nd cell contents $Ag_5Pb_3Sb_5S_{12}$. The space-group is $C_{2h}^5 = P2_1/n$. ypographical errors exist in the halvings listed for diaphorite and eieslebenite; also the space-group of the latter should read $P2_1/c$].

F. A. B.

UERGER (M. J.). *The crystal structure of gudmundite (FeSbS) and its bearing on the existence field of the arsenopyrite structural type.* Zeits. Krist., 1939, vol. 101, pp. 290–316, 6 figs.

The space-group of gudmundite is C_{2h}^5; the unit cell contains four olecules of FeSbS and has *a* 6·02, *b* 5·93, *c* 6·02 Å., β 67° 52′. The nine arameters of the atoms are all obtained with precision. H. S.

AMERMANS (M. A.). *The crystal structure of $SrBr_2$.* Zeits. Krist., 1939, vol. 101, pp. 406–411, 2 figs.

Strontium bromide has the space-group D_{2h}^{16}. The unit cell contains ur molecules of $SrBr_2$ and has *a* 9·20, *b* 11·42, *c* 4·3 A. H. S.

Nowacki (Werner). *Die Kristallstruktur von ScF_3.* Zeits. Krist., 193 vol. 101, pp. 273–283, 4 figs.

The space-group of scandium trifluoride is D_3^7; the rhombohedr unit cell contains one molecule of ScF_3 and has a 4·022, c 7·017, α 8 $34\frac{1}{2}'$. H. S.

Hampson (G. C.) & Pauling (Linus). *The structure of ammoniu heptafluozirconate and potassium heptafluozirconate and the config ration of the heptafluozirconate group.* Journ. Amer. Chem. Soc 1938, vol. 60, pp. 2702–2707, 2 figs.

Ammonium heptafluozirconate crystallizes with a cubic holohedr face-centred unit cell, a 9·365 Å., containing $4(NH_4)_3ZrF_7$. Its stru ture is closely related to that of $(NH_4)_3AlF_6$, the AlF_6 groups bei replaced by ZrF_7 groups in which zirconium has seven-fold co-ordina tion. Rigorous space-group theory does not lead to atomic positio explaining observed intensities of diffraction. A structure involvi some randomness of distribution among positions provided by t space-group O_h^5 fits the data most satisfactorily. The random structu involves unit cubes of the T^4 type with different orientations in differe small regions (100 Å. in linear dimensions) of the crystal. F. A. B.

Caglioti (V.) & Giacomello (G.). *Zur Kenntnis der Natur der ch mischen Bindungen. I. Chiolith und ähnliche Verbindungen.* Natu wiss., 1938, vol. 26, p. 317, 3 figs.

Chiolite has a unit cell, a 9·92, c 5·16 Å., containing $6NaAlF_4.4NaF$ space-group [of the simple cell a 7·00 Å. $= 9{\cdot}92/\sqrt{2}$] $D_{4h}^1 - P4/mmm$ [M.A. **7**–83, 232.] L. J. S.

Mellor (D. P.). *The unit cell and space group of Cs_2CuCl_4.* Zeit Krist., 1939, vol. 101, pp. 160–161.

The space-group of caesium cupric chloride is probably D_{2h}^{16}, perha C_{2v}^7. The unit cell contains four molecules of Cs_2CuCl_4 and has a 9·6 b 12·33, c 7·58 Å. The similar tetramethylammonium compound h probably the same space-group D_{2h}^{16}. H. S.

Náray-Szabó (István) & Sasvári (Kálmán). *A hidrogénaurikloru tetrahidrát kristályformája és tércsoportja.*—Náray-Szabó (St. v & Sasvári (K.). *Kristallform und Raumgruppe des Aurichlorwa serstoff-Tetrahydrats $HAuCl_4.4H_2O$.* Magyar Chemiai Folyóira Budapest, 1938, vol. 44, pp. 157–159. (Hungarian with Germa summary.)

Monoclinic, probably holohedral, crystals from a cupriferous solution, twinning (100), (010), (001), and (110), gave a 14·5, b 11·6, c 15·0 Å., β 76°, with 12 mols. $HAuCl_4.4H_2O$ in the unit cell; space-group $C_{2h}^5 = P2_1/n$. V. Z.

WRYCH (Stanisław). *O strukturze krystalicznej bladożółtego zasadowego chlorku rtęciowego—HgO.2HgCl₂.—Über die Kristallstruktur des hellgelben basischen Quecksilberchlorids—HgO.2HgCl₂.* Roczniki Chemii, Warszawa, 1938, vol. 18, pp. 217–219. (Polish with German summary.)

X-ray powder photographs of material prepared by the method of Carozzi (1926) gave a cubic unit cell of edge 9·211 Å. containing 4 mols. $HgO.2HgCl_2$; calc. density 6·42. [This appears to be identical with the mineral eglestonite, M.A. **5**–234.] L. J. S.

ONEY (Rose C. L.). *An X-ray determination of the structure of tetramethyl ammonium dichloriodide crystals $N(CH_3)_4ICl_2$.* Zeits. Krist., 1939, vol. 100, pp. 519–529, 3 figs.

The space-group of tetramethyl ammonium dichloriodide crystals is C_{2v}^9. The unit cell contains two molecules of $N(CH_3)_4ICl_2$ and has a 9·18, 7·80 Å. H. S.

DSZTAUB (Stanislas). *Arrangement des atomes dans la laurionite PbOHCl.* Compt. Rend. Acad. Sci. Paris, 1939, vol. 208, pp. 1234–1235. [M.A. **7**–84.]

Laurionite consists of layers of $Cl(PbOH)_2Cl$ parallel to the cleavage. Each layer Pb is surrounded by 3Cl at distances 3·13–3·15 A., and 3(H) at 2·64–2·66 A. The nearest Cl of another layer is distant 3·52 A. C. A. S.

OREAU (J.) & VERHULST (J.). *L'atacamite du Katanga.* Bull. Cl. Sci. Acad. Roy. Belgique, 1938, ser. 5, vol. 24, pp. 716–720, 1 fig.

Small (1 mm.) crystals (*b s x m e r*) of atacamite occur with gerhardtite in cavities in cuprite [from Likasi mine, M.A. **3**–52]. Optic axial plane (010), $Bx_\alpha \perp (010)$, 2V 72–73°, $n > 1{\cdot}82$. X-ray rotation and Laue photographs give a unit cell, a 6·01, b 9·13, c 6·84 A. ($a : b : c = 0{\cdot}658 : 1 : 0{\cdot}749$), containing two molecules $CuCl_2.3Cu(OH)_2$; space-group V_h^{16}. L. J. S.

BST (A.). *A fluoride with pyrochlore structure.* Nature, London, 1939, vol. 143, pp. 520–521.

The structure of ralstonite is similar to that of minerals of the

pyrochlore group; space-group $O_h^7 = Fd3m$. The unit cube of ed
9·87 Å. contains $Na_{2\cdot7}(Al,Mg)_{16}(F,OH)_{48}.7H_2O$. The mineral may b
dehydrated without destruction of the lattice. L. J. S.

Arkel (A. E. van), Verwey (E. J. W.), & Bruggen (M. G. van
Ferrites I. Rec. Trav. Chim. Pays-Bas, 1936, vol. 55, pp. 331–33
1 fig. *Ferrites II.* Ibid., pp. 340–347, 1 fig.

Verwey (E. J. W.) & Boer (J. H. de). *Cation arrangement in a fe
oxides with crystal structures of the spinel type.* Ibid., pp. 531–54
1 fig.

The spinel-type ferrites of several divalent metals, $RO.Fe_2O_3$, ca
take excess Fe_2O_3 into solid solution, a defect lattice being develope
The solid solutions are magnetic, the more so the greater the excess
Fe_2O_3. The solution limit varies markedly, more Fe_2O_3 being dissolve
the higher the temperature. No definite compounds are formed. Wit
manganese ferrite, oxidation of the manganese complicates the syste
at 1300° C., a complete series of solid solutions from hausmannite t
about $Mn_3O_4.6Fe_2O_3$ is formed, with a continuous transition from th
tetragonal hausmannite lattice to a cubic spinel one; at 700° C. oxidatio
goes further, and bixbyite is formed, with a cubic *C*-type lattice. Th
system FeO–Fe_3O_4–Fe_2O_3 was also studied and the solubility limi
determined. The ferrites are also capable of dissolving the divale
oxides at high temperatures. The detailed structure of the R_3O_4 oxid
is considered and it is concluded from a consideration of the electric
conductivity that Fe_3O_4 is $Fe'''[Fe''Fe''']O_4$ (where the square bracke
indicate the atoms in the 16-fold lattice position of the spinel structure
Co_3O_4 is $Co'''[Co''_2]O_4$, and Mn_3O_4 is $Mn'''[Mn''_2]O_4$. In γ-Fe_2O_3 th
vacant lattice positions are mainly in the 16-fold position, $Fe'''[Fe^{\cdot\cdot}_{1\cdot66}]O$
Using the method of P. Dubois γ-Mn_2O_3 was prepared, and its structu
confirmed; it is shown to contain only trivalent manganese, and t
have a tetragonal structure with a 8·1, c 9·4 A., related to hausmannit
as γ-Fe_2O_3 is to magnetite. It is probable that γ-Co_2O_3 also exists.

M. H. H.

Mellor (D. P.). *A note on the unit cell and probable space group
strontium hydroxide octohydrate $Sr(OH)_2.8H_2O$.* Zeits. Krist., 193
vol. 100, pp. 441–442.

Strontium hydroxide octohydrate has the space-group D_{4h}^2. Th
unit cell contains four molecules of $Sr(OH)_2.8H_2O$ and has a 8·9

1·55 A. The earlier determination of the structure by Natta (1928) s incorrect. H. S.

DELSKÖLD (Volrath). *X-ray studies on magneto-plumbite, $PbO.6Fe_2O_3$, and other substances resembling "beta-alumina", $Na_2O.11Al_2O_3$.* Arkiv Kemi, Min. Geol., 1938, vol. 12A, no. 29, 9 pp. 3 figs.

An artificial lead ferrite has a hexagonal unit cell a 5·877, c 23·02 A., ntaining 2 mols. $PbO.6Fe_2O_3$ and space-group $C6/mmc = D^1_{6h}$ and is ntical with the mineral magnetoplumbite [M.A. **3**–5, **7**–308]. It is ggested that the previous analyses of the mineral leading to the rmula $PbO.5Fe_2O_3$ give too high a lead content owing to minute clusions of kentrolite. The crystal-structure is similar to that of alumina $Na_2O.11Al_2O_3$ [M.A. **7**–86], containing blocks of the spinel d magnetite structures linked by AlO_4 tetrahedra in the first instance d by 12Pb, 6Fe, and 6O for magnetoplumbite. F. A. B.

RATKY (O.) & NOWOTNY (H.). *Zur Kristallstruktur von β-FeOOH.* Zeits. Krist., 1938, vol. 100, pp. 356–360, 4 figs.

A discussion of the relations between the structures of α, β, and FeOOH. H. S.

ERMER (L. H.). *Electron diffraction rings produced by hydroxide contamination.* Zeits. Krist., 1938, vol. 100, pp. 277–284, 3 figs.

Extra rings occurring in electron diffraction patterns were traced to layer of $Ni(OH)_2$ deposited from aqueous solution on the thin foil ing across the narrow slit, on which materials for investigation by the ansmission method are usually mounted. H. S.

RANK (F. C.). *Electrical evidence on calcite imperfection.* Nature, London, 1936, vol. 137, pp. 656–657.

From Joffés data for the electrical conductivity of calcite, it is calcuted that 0·018 % of the lattice positions in calcite (both cations and ions) are vacant. This introduces a significant correction into the alues of X-ray wave-lengths derived from experiments using calcite. M. H. H.

NDSAY (Geo. A.) & HOYT (H. C.). *The lattice constants of cerussite.* Zeits. Krist., 1938, vol. 100, pp. 360–361, 1 fig.

The spacing of structure planes of cerussite parallel to (100), (010), 01), (110), (111), (121) was determined with a high degree of accuracy. or the unit cell was deduced a 5172·6, b 8480·0, c 6130·2 x.u. H. S.

Heritsch (H.) & Machatschki (F.). *Kristallsystem und Gitterkonstanten von Artinit.* Zentr. Min., Abt. A, 1939, pp. 65–69.

X-ray photographs of needles of artinite from Kraubath, Styria, indicate monoclinic symmetry with a 8·33, b 3·14, c 6·20 Å., β 80° 15′. Sp. gr. 2·04. The unit cell contains $Mg_2(OH)_2CO_3.3H_2O$. [M.A. **6**–474.]

L. J. S.

Palache (Charles). *Antlerite.* Amer. Min., 1939, vol. 24, pp. 293–305, 6 figs. Including:

Richmond (W. E.). *X-ray study of antlerite.* Ibid., pp. 300–301.

Jarrell (O. W.). *Occurrence of antlerite at Chuquicamata.* Ibid., pp. 301–302.

Antlerite is the principal copper mineral of the oxidized zone at Chuquicamata, Chile. The dominant forms of antlerite from this locality and also from Bisbee, Arizona, have been tabulated. X-ray data on crystals, sp. gr. 3·88, are a 8·22, b 11·97, c 6·02 Å., space-group $D_{2h}^{16} = Pnam$. The unit cell contains $4Cu_3SO_4(OH)_4$, calculated density being 3·93. There is a possibility that heterobrochantite of H. Buttgenbach [M.A. **3**–270] is antlerite.

F. A. B.

Richmond (W. E.) & Wolfe (C. W.). *Crystallography of lanarkite.* Amer. Min., 1938, vol. 23, pp. 799–804, 2 figs.

X-ray measurements of lanarkite from the Susanna mine, Leadhills, Lanarkshire, yield a 13·73, b 5·68, c 7·07 Å., β 63° 47′, space-group $C_{2h}^3 = C2/m$. This new setting gives calculated axial ratios $a : b : c$ = 2·417 : 1 : 1·245, in agreement with new goniometric measurements 2·4137 : 1 : 1·2363, β 63° 54′. The specific gravity is 6·92, giving a unit cell content of $4Pb_2SO_5$. Optical measurements in sodium-light are α 1·928, β 2·007, γ 2·036; 2V 60° ± 2°, negative; extinction-angle $\gamma : c$ = 30°. New forms for lanarkite (referred to the new setting) are c (001), d (103), E ($\bar{4}03$), R ($\bar{8}01$), and P ($\bar{1}11$).

F. A. B.

Ramsdell (Lewis S.). *Composition, space group and unit cell of hanksite.* Amer. Min., 1939, vol. 24, pp. 109–115.

The hexagonal unit cell of hanksite containing $18Na_2SO_4.4NaCO_3.2KCl$ has the dimensions a 10·46, c 21·18 Å., and probable space-group $C_{6h}^2 = C6_3/m$. The crystal-structure is possibly a superstructure based upon 12 unit cells of the hexagonal high-temperature form of Na_2SO_4.

F. A. B.

RACH (Heinz). *Die Struktur von Mn-Leonit.* Zeits. Krist., 1939, vol. 101, pp. 39–77, 20 figs.

In-leonite, crystallized by evaporating a solution of K_2SO_4 + $MnSO_4$. O, has the space-group C_{2h}^3. The unit cell contains four molecules $MnK_2(SO_4)_2.4H_2O$ and has a 11·986, b 9·57, c 9·95 A., β 85°. The cture has much in common with the Tutton salts and the alums.

H. S.

INERT (Gerhard). *Über den Kieserit von Wathlingen und die Raumgruppenbestimmung des Kieserits.* Neues Jahrb. Min., Abt. A, 1939, Beil.-Bd. 75, pp. 297–314, 2 figs. [M.A. 7–236.]

Kieserite crystals of prismatic or pyramidal habit are described for first time from Wathlingen, Hanover. X-ray measurements yield ·89, b 7·69, c 7·65 Å., β 62° 7′; space-group C_{2h}^6. F. A. B.

ELL (G.), MERWIN (H. E.), & KSANDA (C. J.). *The crystallography of potassium tetrathionate.* Amer. Journ. Sci., 1938, ser. 5, vol. 35A, pp. 361–372, 1 fig.

oniometric measurements of the clinohedral-monoclinic crystals e $a : b : c = 1{\cdot}3885 : 1 : 1{\cdot}2615$, β 75° 59′. X-ray measurements gave nit cell, a 22·05, b 7·99, c 10·09 Å., β 77° 55′, containing 8 mols. $_4O_6$. Space-group $C_s^4 = Cc$. The crystals show pyroelectric and zoelectric effects. There is a perfect cleavage (100). Optic axial ne (010), $\gamma : c = +33°$, 2V 66°, positive, α 1·5896, β 1·6057, γ 1·6435.

L. J. S.

ODLING (Florrie M.) & COHEN (S. B.). *An X-ray examination of chillagite.* Journ. Roy. Soc. New South Wales, 1938, vol. 71 (for 1937–38), pp. 543–546.

The supposed distinction of chillagite [M.A. 1–421] from wulfenite d stolzite as given by the axial ratio (C. D. Smith and L. A. Cotton, 2) is not supported by X-ray data. The original material gave ·43, c 12·08 A., with 4 mols. $Pb(Mo,W)O_4$ in the unit cell, showing o be intermediate between wulfenite and stolzite. L. J. S.

ASSEUR (H.) & RASSENFOSSE (A. de). *The crystal structure of hydrated potassium chlorostannite.* Zeits. Krist., 1939, vol. 101, pp. 389–395, 3 figs.

Potassium chlorostannite has the space-group D_{2h}^{16}. The unit cell tains four molecules of $K_2SnCl_4.H_2O$ and has a 8·21, b 12·05, c 9·10 A.

H. S.

Kraus (O.). *Kristallographische und röntgenographische Untersuchung an einer neuen Hydratgruppe der 12-Heteropolysäuren. Ein Beitrag zur Kenntnis der Kristallstruktur und der kristallchemischen Eigenschaften der Heteropolyverbindungen.* Zeits. Krist., 1939, vol. 10 pp. 394–413, 3 figs.

An isomorphous group of hydrated acids exists with space-group and unit cell, containing eight molecules, having dimensions:

	a.	*b.*	*c.*	*α.*	*β.*	*γ*
$H_3PW_{12}O_{40}.14H_2O$ ...	20·48	19·32	22·48	95° 37′	95° 9′	90°
$H_3PMo_{12}O_{40}.14H_2O$ ...	20·12	19·25	22·55	95 17	96 37	92
$H_4SiW_{12}O_{40}.14H_2O$ ...	20·47	19·38	22·40	95 36	94 43	90
$H_4SiMo_{12}O_{40}.14H_2O$ ...	20·21	19·25	22·50	95 12	96 38	92
$H_5BW_{12}O_{40}.14H_2O$ ...	20·40	19·27	22·37	96 10	93 43	90

They have well-marked isotypy with their salts. H. S.

Gliszczynski (S. von). *Beitrag zur "Isomorphie" von Monazit u. Krokoit.* Zeits. Krist., 1939, vol. 101, pp. 1–16, 4 figs.

Monazite has the space-group C_{2h}^5; the unit cell contains four molecules of $CePO_4$ and has a 6·782, b 6·993, c 6·455 Å., β 76° 22·1′. Crocoite has the space-group C_{2h}^5; the unit cell contains four molecules $PbCrO_4$ and has a 7·108, b 7·410, c 6·771 Å., β 77° 33′. The two minerals are of similar constitution but are only isomorphic in a restricted sense of the word, and monazite has closer affinities with xenotime than with crocoite. H. S.

Sasvári (Kálmán). *Az ezüstpermanganát ($AgMnO_4$) kristályszerkezete.* Sasvári (K.). *Die Kristallstruktur des Silberpermanganats $AgMnO_4$.* Mat. Term.-tud. Értesítö, Budapest, 1937, vol. 56, pp. 493–50 1 fig. (Hungarian with German summary.)

—— *Az ezüstpermanganát kristályszerkezetének Fourier-analizise. Fourier-Analyse der Struktur des Silberpermanganats.* Ibid., 193 vol. 57, pp. 988–998, 2 figs. (Hungarian with German summary.

The structure of silver permanganate [M.A. 4–365] is complete determined, and is similar to that of baryte. The parameters of the atoms are x 0·025, y 0·31, z 0·34, and of the Mn atoms x 0·25, y −0·0 z −0·31. V. Z.

Richmond (Wallace E.). *Tarbuttite.* Amer. Min., 1938, vol. 23, pp. 88 893, 9 figs.

X-ray rotation and Weissenberg photographs of a small crystal

buttite from Broken Hill mines, Northern Rhodesia, yield unit-cell ensions a 8·097, b 12·91, c 7·688 Å., α 89° 34½′, β 91° 35½′, γ 107° 47′, ng $a : b : c = 0{\cdot}6271 : 1 : 0{\cdot}5957$. Two-circle measurements on good stals yield, in the new orientation, $a : b : c = 0{\cdot}6296 : 1 : 0{\cdot}5971$; ° 37½′, β 91° 28½′, γ 107° 41′. The unit-cell contents of tarbuttite 8[$Zn_2PO_4(OH)$]. [Min. Mag. **15**–1.] F. A. B.

GELE (G.). *Adelit und Descloizit.* Neues Jahrb. Min., Abt. A, 1939, Beil.-Bd. 75, pp. 101–109.

The unit-cell dimensions of adelite are a 8·94, b 7·47, c 5·88 Å.; space-up D_2^1, a subgroup of V_h^{16}, which is the space-group of descloizite, also confirmed. The unit cell of adelite contains 8CaMg(OH)AsO_4 is isomorphous with that of descloizite. Neither mineral yields a itive piezoelectric effect. F. A. B.

GELE (G.) & MACHATSCHKI (F.). *Britholith — ein Cererdensilikat-apatit.* Naturwissenschaften, 1939, vol. 27, pp. 132–133.

—— *Der Britholith ist ein Cererden-Silikatapatit!* Zentr. Min., Abt. A, 1939, pp. 165–167.

CHATSCHKI (F.). *Sind Abukumalit und Britholith Glieder der Apatit-reihe?* Ibid., 1939, pp. 161–164.

X-ray photographs of britholite from Greenland give a unit cell a 9·61, 92 Å. ($c/a = 0{\cdot}735$), corresponding to those of apatite and ellestadite A. **7**–14]. The formula is therefore written in the form $(Ce,Ca,Na)_5$ OH)$[(Si,P)O_4]_3$. Abukumalite [M.A. **7**–225] is the corresponding rium silicate apatite. L. J. S.

RUNZ (H.). *Pulverdiagramme von Amblygonit, Fremontit, Graftonit, Repossit und Karyinit.* Zentr. Min., Abt. A, 1939, pp. 248–251.

Amblygonite (PO_4(F,OH)AlLi), fremontite (PO_4(OH,F)AlNa), and rangite (AsO_4FAlNa) give similar X-ray powder photographs indi-ing that they are isomorphous. Repossite [M.A. **6**–52] is identical h graftonite, while karyinite with a similar formula gives a distinct ray pattern. L. J. S.

KKOROS (P.). *Gitterkonstanten und Raumgruppe von Triploidit* $(Mn,Fe)_2(OH)[PO_4]$. Zentr. Min., Abt. A, 1938, pp. 278–280.

Triploidite from Hagendorf, Bavaria [M.A. **1**–125, **2**–417], gave a unit , a 12·10, b 13·13, c 9·71 Å., β 71° 42′, containing 16 molecules. ace-group C_{2h}^5, sp. gr. 3·84. L. J. S.

Hägele (G.). *Sarkinit und Triploidit.* Zentr. Min., Abt. A, 19[illegible] pp. 267–273.

Sarkinite from Pajsberg, Sweden, gave a unit cell, a 12·65, b 13·[illegible] c 10·15 Å., β 71° 16′, containing 16 mols. $Mn_2AsO_4(OH)$. It is therefo[illegible] isomorphous with triploidite [preceding abstract]. L. J. S.

Kraus (O.) & Mussgnug (F.). *Gitterkonstanten und Raumgruppe v[illegible] Wagnerit $Mg(MgF)PO_4$.* Naturwissenschaften, 1938, vol. 2[illegible] pp. 801–802.

The cell dimensions a 11·90, b 12·51, c 9·63 Å. give $a : b : c = 0·951$[illegible] 1. : 0·7697, β 71° 53′, in agreement with previous goniometric measur[illegible] ments but with the b-axis doubled. Space-group probably C_2^5 16 molecules in the unit cell. Wagnerite is closely related to triploidi[illegible] and sarkinite [preceding abstracts]. L. J. S.

Elliott (Norman). *A redetermination of the carbon–oxygen distance [illegible] calcite and the nitrogen–oxygen distance in sodium nitrate.* Jour[illegible] Amer. Chem. Soc., 1937, vol. 59 (part 2), pp. 1380–1382, 2 figs.

New determinations of the oxygen parameter for calcite and sodiu[illegible] nitrate give, for the small cell with α 46–47° and C or N at (000) an[illegible] $(\frac{1}{2}\frac{1}{2}\frac{1}{2})$, $u = 0·2635$ for calcite and 0·2394 for sodium nitrate, leading t[illegible] distances C–O 1·313 Å. and N–O 1·210 Å. M. H. H.

Chao (S. H.) & Taylor (W. H.). *Lamellar structure of potash-sod[illegible] felspars.* Nature, London, 1939, vol. 143, pp. 1024–1025.

X-ray examination of microperthite shows that the potash-felspa[illegible] component is monoclinic and the soda-felspar is triclinic; the latte[illegible] being twinned on the pericline law in the low-soda type (< 30 % soda[illegible] felspar), and on the albite law in the high-soda type. L. J. S.

Ito (T.). *The existence of a monoclinic soda felspar.* Zeits. Krist., 193[illegible] vol. 100, pp. 297–307, 8 figs.

Rotation and goniometer X-ray experiments on moonstone fro[illegible] Meisen, Korea [anal. P, Min. Mag. **24**–456], and orthoclase point to th[illegible] existence of a monoclinic soda-felspar submicroscopically intergrow[illegible] with sanidine in moonstones. Its unit cell has a 7·94, b 12·90, c 7·12 Å[illegible] β 64°. H. S.

Thornely (P. C.) & Taylor (W. H.). *The coordination of aluminiu[illegible] in andalusite.* Mem. Manchester Lit. Phil. Soc., 1939, vol. 83 (fo[illegible] 1938–39), pp. 17–30, 3 figs.

In the crystal structures of kyanite, sillimanite, and andalusite the sil[illegible]

n atoms are situated within four oxygen atoms grouped in tetrahedra, d one-half of the aluminium atoms are placed at the centres of octa- dral groups of six oxygen atoms. The remaining aluminium atoms are tahedrally co-ordinated in kyanite, tetrahedrally co-ordinated in silli- nite, but in andalusite they are situated at the centres of groups of e oxygen atoms. The presence of these unusual AlO_5 groups in anda- site has now been fully confirmed by Fourier analysis of X-ray photo- phs of a flake of pale-green andalusite from Ceylon. F. A. B.

OLZNER (Julius). *Über den "anomalen" Kristallbau der Biotite.* Zeits. Krist., 1936, vol. 95, pp. 435–450, 2 figs.

By recalculating thirty-six recent biotite analyses on the basis of ven oxygen atoms it is shown that the composition of biotite is inter- ediate between that of phlogopite and muscovite and also suggested at the crystal-structure is built up of layers of the two mica-types. st biotite approximates to the composition of two of phlogopite to e of muscovite, which yields the formula $KMg_2Al_{0\cdot667}[AlSi_3O_{10}](OH)_2$ th the usual replacements of K, Mg, and Al by Na, Fe″, Fe‴, &c. o X-ray measurements.] F. A. B.

NDRICKS (Sterling B.) & JEFFERSON (Merrill E.). *Crystal structure of vermiculites and mixed vermiculite-chlorites.* Amer. Min., 1938, vol. 23, pp. 851–862, 2 figs.

Single crystals of chemically analysed vermiculite were found to ld substantially the same unit-cell dimensions a 5·33, b 9·18, c 28·85 Å., 86° 45′, values in agreement with Gruner's [M.A. **6**–181] except for which is 4° smaller. A Fourier analysis of the measured relative inten- ies of the basal diffractions confirms Gruner's structure, i.e. inter- ved water and talc-like layers. The structure resembles those of ic, pyrophyllite, and dickite in that the talc-like layers have random ifts of $n/6$ along the b-axis. The data obtained from one vermiculite ecimen showed that the structure was predominantly vermiculite th about one layer of chlorite for seven layers of vermiculite. Many nerals previously described as vermiculites are mixed vermiculite- lorites or vermiculite-micas and all three types may occur in a re- icted locality. F. A. B.

O (T.). *The determination of lattice constants of triclinic crystals from one crystal setting—a special case.* Zeits. Krist., 1939, vol. 100, pp. 437–439, 2 figs.

Buerger's method [M.A. **6**–165, **7**–242] of determining triclinic con-

stants from a single crystal setting was applied to schizolite. Its un cell contains two molecules of $HNa(Ca,Mn)_2Si_3O_9$ and has a 8·0 b 7·24 c 7·05 Å., α 90°, β 95° 22′, γ 101° 56′. H. S.

Wyart (J.). *Étude sur la leucite.* Bull. Soc. Franç. Min., 1938, vol. 6 pp. 228–238, 4 figs. [M.A. **6**–412; **7**–237, 278.]

When leucite is heated the c-axis of the tetragonal cell contracts an a expands until they are equal and the crystal then cubic; at the san time there is a gradual diminution in the birefringence. There is n abrupt change, and the heating-curve shows only a slight sinuosit between 375° and 625°.

Temp.	20°	290°	520°	625°	750°
a	12·95	13·08	13·18	13·40	13·45Å.
c	13·65	13·63	13·55	13·40	13·45

L. J. S.

Kraus (O.). *Röntgenographische Untersuchungen an Gismondin.* Zent Min., Abt. A, 1939, pp. 105–109.

Gismondine [locality ?] gave a base-centred orthorhombic cel a 13·68, b 14·28, c 10·60 A., containing 8 mols. $Ca[Al_2Si_2O_8].4H_2O$ Space-group $D_{2h}^{19} = Cmmm$ or $D_{2h}^{22} = Ccca$. The a- and b-axes are nea those of natrolite and thomsonite, but the c-axis is different. [M.A **4**–375, **5**–163.] L. J. S.

[Brunovsky (B. K.)] Brunowsky (B.). *Die Struktur des Katapleit* ($Na_2ZrSi_3O_9.2H_2O$). Acta Physicochimica URSS, 1936, vol. 5 pp. 863–892, 1 pl., 15 text-figs. [M.A. **7**–238.]

The unit cell of catapleiite, a 7·39, c 10·05 A., contains twice the abov formula, and the halvings indicate C_{6v}^4, D_{3h}^4, or D_{6h}^4 as the space-group A detailed structure is deduced, a characteristic of which is the presenc of Si_3O_9 rings as in benitoite. M. H. H.

Zedlitz (Otto). *Der Perowskit. Mineralogische und röntgenographisch Untersuchungen an Perowskit, Uhligit und Dysanalyt sowie an dere synthetischen Produkten.* Neues Jahrb. Min., Abt. A, 1939, Beil.-Bd 75, pp. 245–296, 5 pls., 15 text-figs.

The unit-cell dimension of perovskite is 7·6 Å., not 3·8 Å. as previously accepted. The lamellae observed are supposed to be monoclinic resulting from the deformation of the ideally octahedral co-ordination of titanium Lamellae are not observed in dysanalyte and this is referred to differen sizes of the ions involved. Uhligite is structurally identical with perov skite. F. A. B.

Instruments and Apparatus.

AGG (W. L.). *A new type of 'X-ray microscope'.* Nature, London, 1939, vol. 143, p. 678, 3 figs.

Holes are drilled in a thin plate of brass, one for each X-ray diffraction *hkl*) of diopside. The positions of the holes correspond to a projection the reciprocal lattice of the mineral on the plane (010) and the area each hole is proportional to the structure-factor of the given plane. e brass plate, when drilled, is placed between a pair of lenses each of out 6 feet focal length and a pin-hole in front of a mercury-vapour mp is placed at the focus of one of the lenses. The diffraction of the n pencil of intense monochromatic light by the holes in the brass ate results in the formation of a realistic image of the projection of the stal-structure of diopside on the plane (010), which can be seen through microscope placed to view the image of the illuminated pin-hole rmed at the focus of the second lens. F. A. B.

EVERS (C. A.). *A machine for the rapid summation of Fourier series.* Proc. Physical Soc. London, 1939, vol. 51, pp. 660–667, 1 fig.

A uniselector switch has been utilized to perform one-dimensional urier summations at high speed, thus avoiding long and tedious calcu-ions necessary for crystal-structure analyses. F. A. B.

GE (J. A., *Jr.*). *A vertical illuminator for low magnification photography of polished surfaces.* Amer. Min., 1939, vol. 24, pp. 400–403, 4 figs.

An illuminator designed for the examination of the entire polished rface of an ore at one time. F. A. B.

NCHELL (Horace). *A new micropycnometer for the determination of densities of heavy solids.* Amer. Min., 1938, vol. 23, pp. 805–810, 1 fig.

A small silica-glass micropyknometer is figured with an internal lume of 0·1319 c.c. By using toluene as the displacement liquid and iling with the mineral powder *in vacuo* the error of determining the ecific gravity of 0·1 c.c. mineral (sp. gr. 4·0 to 7·5) is reduced to 1 %. F. A. B.

RMAN (Harry). *A torsion microbalance for the determination of specific gravities of minerals.* Amer. Min., 1939, vol. 24, pp. 434–440, 2 figs.

A special type of microbalance has been adapted to specific gravity easurements using either toluene or carbon tetrachloride as the dis-acement liquid. For 25 mg. of a mineral with a specific gravity near an accuracy of $\pm$ 1 % is claimed. F. A. B.

Blank (Eugene W.). *Separation of magnetic particles under the micr scope.* Journ. Chem. Education (Amer. Chem. Soc.), 1937, vol. 1 p. 33, 1 fig.

Difficulty in detaching magnetic particles from a magnetized needle avoided by using a needle embedded in glass and wound as an electr magnet. The device has several advantages. M. H. H.

Hurlbut (Cornelius S., *Jr.*). *An electrical counter for thin-sectio analysis.* Amer. Journ. Sci., 1939, vol. 237, pp. 253–261, 1 pl.

The section to be measured by the Rosiwal method lies directly on mechanical microscope stage, which is actuated by means of a flexib cable connected with the separate recording unit containing a sma motor. One or other of six keys are held depressed during the time th different grains in the section are being traversed. This is much quick and less fatiguing than other methods. [Min. Mag. **24**–577.] L. J. S.

Physical Properties.

Brilliantow (N. A.) & Obreimow (I. W.). *On plastic deformation of roc salt. IV.* Physikal. Zeits. Sowjetunion, 1937, vol. 12, pp. 7–1 2 pls., 8 text-figs.

When a flat rectangular plate of rock-salt is bent, the edge face become broken up into small, approximately plane facets subtendin small angles with one another, the plate itself developing a series birefringent stripes which correspond to the boundaries of these plan facets. The structure of the deformed crystal is discussed in detai [Unfortunately the term 'twins' is used throughout, although it is clea that twinning in the usual sense is not involved.] M. H. H.

Fairbairn (H. W.). *Correlation of quartz deformation with its cryst structure.* Amer. Min., 1939, vol. 24, pp. 351–368, 7 figs.

Equating the facility of cleavage of quartz with the number of tetra hedral bonds broken per unit area it is found that the cleavage shou increase in difficulty in the order r $(10\bar{1}1)$, z $(01\bar{1}1)$, m $(10\bar{1}0)$, c (0001 and a $(11\bar{2}0)$, in agreement with experimental results. 'In addition t purely structural reasons for rupture of quartz approximately parall to the vertical axis, imperfections in the form of lineages possibly in fluence the spacing and ease of rupture on this zone.' F. A. B.

Birch (Francis) & Bancroft (Dennison). *The elasticity of certain roc and massive minerals.* Amer. Journ. Sci., 1939, vol. 237, pp. 1–6.

Elasticity constants (Young's modulus, rigidity modulus, Poisson

tio, velocities of compressional and distortional waves) at ordinary temrature and pressure were determined for various igneous rocks and for assive magnetite, pyrite, and pyrrhotine. The latter are compared with e published values for single crystals of these minerals. L. J. S.

KSTEIN (Jean). *L'influence de la température sur la plasticité et sur la rupture des cristaux.* Compt. Rend. Acad. Sci. Paris, 1939, vol. 208, pp. 1098–1100.

Application of the analogy of monochromatic oscillators, which is at e base of Einstein's theory of specific heats, to a calculation of the robability of the occurrence of abnormally large displacements of the uilibrium position of atoms in a crystal (e.g. of NaCl), which cause pture and plastic deformation at much below the calculated tension, conciles the diverse results previously obtained. C. A. S.

RIDGMAN (P. W.). *The high pressure behavior of miscellaneous minerals.* Amer. Journ. Sci., 1939, vol. 237, pp. 7–18.

The compressibility of calcite shows two jumps upwards between essures of 14,000 and 17,000 kg/cm², corresponding to two transitions phase. In silica-glass the first rapid compression (due to cavities) is ested at about 35,000. Various rocks were examined, mostly with gative results, for any transition. Shearing under pressure changed rtzite (sp. gr. 4·087) to blende (sp. gr. 4·102), but some other inerals showed no change.

essure kg/cm² ...	...	5,000	10,000	15,000	20,000	35,000	50,000
alcite ΔV/cm³ ...	...	0·0066	0·0130	0·0192	0·077	0·092	0·102
lica-glass ΔV/cm³	...	0·0137	0·0277	0·0421	0·0570	0·1040	0·1394
asalt-glass ΔV/cm³	...	0·0111	0·0210	0·0300	0·0385	0·0622	0·0858

L. J. S.

ALYI (Károly). *Vizsgálatok az ingás sklerométerrel.*—BALYI (Karl). *Untersuchungen mit dem Pendelsklerometer.* Földtani Közlöny, Budapest, 1938, vol. 68, pp. 221–229, 4 figs. (Hungarian with German summary.) [M.A. 7–243.]

Values of the hardness both from the width of the scratches and from ie minimum amplitudes of the pendulum sclerometer with steel edge e in the order of the Mohs's scale up to the orthoclase; beyond that ie instrument is not suitable. The method demonstrates that the egrees of the Mohs's scale are very unequal. V. Z.

OBERTS (Howard S.). *Direct measurement of silicate heats of melting.* Amer. Journ. Sci., 1938, ser. 5, vol. 35A, pp. 273–287, 4 figs.

The latent heat of melting of K_2SO_4 (m.p. 1069°) is 46·5 cal./g., and

there is also an absorption of 8·8 cal. at the inversion temperature (583°). Graphs are given for impure Na_2SiO_3. L. J. S.

Jahns (Richard H.). *Clerici solution for the specific gravity determination o small mineral grains.* Amer. Min., 1939, vol. 24, pp. 116–122, 3 figs.

A method is described of adjusting the concentration of a Clerici solution contained in a small tank until a mineral grain 0·15–0·32 mm diameter is balanced, a microscope being used to view the grain. The refractive index of a drop of the solution is then measured and from a calibration chart the specific gravity of the grain read directly. An accuracy of $\pm$ 0·01 is claimed. F. A. B.

Trombe (Félix). *Le dosage du quartz par analyse thermique différentielle.* Compt. Rend. Acad. Sci. Paris, 1938, vol. 207, pp. 1111–1113, 2 figs.

The arrangement is figured diagrammatically, and described with exemplary curves. It depends on a comparison of the dt/t curves for the mineral under examination and for pure precipitated SiO_2, when heated so that the quartz passes through the α–β transformation (at about 575°). C. A. S.

Pavlík (Bohuslav). *Kann man auch Kristalle von minderer Symmetrie auf einfache Weise piezoelektrisch erregen?* Zeits. Krist., 1939, vol. 100, pp. 414–419, 4 figs.

Formulae are given to show the direction in which plates of hemihedral or hemimorphic monoclinic crystals must be cut to show piezoelectric phenomena. The method is applied successfully to cane-sugar. H. S.

Bellanca (Angelo). *Piezoelettricità polare e simmetria di alcune specie cristalline. Nota II.* Periodico Min. Roma, 1939, vol. 10, pp. 1–6, 1 pl. [M.A. 7–246.]

Apatite gives no piezoelectric effect, and is therefore bipyramidal and not pyramidal as suggested by etch-figures. Wulfenite gives an effect indicating a polar tetrad axis, but the crystals are twinned on (001). L. J. S.

Krishnan (K. S.) & Banerjee (S.). *Magnetic anisotropies and the valencies of paramagnetic atoms in crystals.* Nature, London, 1938, vol. 142, p. 717.

The magnetic anisotropy of manganite indicates that the Mn atoms are not trivalent. They are probably half divalent and half tetravalent. M. H. H.

RISHNAN (K. S.) & GANGULI (N.). *Temperature variation of the magnetic anisotropy of graphite.* Zeits. Krist., 1939, vol. 100, pp. 530–536, 1 fig.

The magnetic susceptibility of graphite parallel to the base and along e hexagonal axis were measured for temperatures of 100° to above 00° C. Both decrease as the temperature rises, but the rate of decrease minishes at higher temperatures. H. S.

OHN (W. J.). *Temperature variation of the magnetic anisotropy of bismuth crystal.* Zeits. Krist., 1939, vol. 101, pp. 337–344, 2 figs.

For a crystal containing 99·998 % bismuth the magnetic anisotropy as $0{\cdot}402 \times 10^{-6}$ per gm. at 27° C. With rise of temperature the magnetic nisotropy falls off linearly, being $0{\cdot}09 \times 10^{-6}$ at 260° C. Above this mperature there is very little decrease till the crystal melts at 271·1° C. bismuth crystal of less purity showed anomalous behaviour near the elting-point. H. S.

OOKHERJI (A.) & TIN (Maung Than). *The magnetic anisotropy of* $CuSeO_4.5H_2O$. Zeits. Krist., 1939, vol. 101, pp. 412–417, 1 fig.

Copper selenate is triclinic with axial ratios $a : b : c = 0{\cdot}5675 : 1 : 0{\cdot}5551$, $= 81° 58'$, $\beta = 106° 34'$, $\gamma = 103° 11'$. The principal magnetic susptibilities are 1140, 1410, 1420 at 28° C., and the corresponding agnetic axes make with the crystallographic axes the angles 155°, °, 51°; 65°, 86°, 42°; 81°, 27°, 102°. H. S.

ICHEL (A.). *Propriétés magnétiques de quelques solutions solides.* Ann. Chimie, 1937, ser. 11, vol. 8, pp. 317–423, 26 figs.

The ferromagnetic properties of the oxides of iron and of the ferrites, d of pyrrhotine, FeS, and solutions of selenium, arsenic, and metals FeS have been studied in detail, together with their dependence on mperature and heat-treatment. Pyrrhotine and γ-Fe_2O_3 are regarded excess (interstitial) lattices, not defect lattices, and reasons are given r this conclusion. M. H. H.

Crystal-optics.

EDENEJEWA (N.), GRUM-GRŽIMAJLO (S.), & WOLKOFF (A.). *Interferenzmethode zur Bestimmung des Brechungsexponenten mit dem Mikroskop.* Acta Physicochimica URSS, 1936, vol. 5, pp. 391–404, 7 figs.

A simple method is described permitting the determination of the fractive indices of immersion media (both liquids and melts) with fair

accuracy on the actual drop used for comparison with a mineral. Littl auxiliary apparatus is required. M. H. H.

Prosad (K.) & Gupta (R. P.). *A ray-displacement refractometer fo accurate work.* Indian Journ. Physics., 1937, vol. 11, pp. 13–19, 1 pl. 1 text-fig.

A method is described for the accurate determination of the refrac tive index of a plane-parallel plate or of a liquid in a plane-parallel cell using a spectrometer with the telescope replaced by a low-power micro scope with eyepiece micrometer; for a glass plate 0·3 mm. thick a accuracy of $\pm 0{\cdot}0002$ in the refractive index was attained. [The attain able accuracy will obviously depend on many factors which are no discussed.] M. H. H.

Carpanese (Tullio). *Contributo alla tecnica del metodo di immersione* Zeits. Krist., 1939, vol. 101, pp. 285–289, 2 figs. (Italian with Ger man summary.)

The author gives improvements on the methods of Wright, Panichi and Correns for determining the refractive index of small crystals b immersing them in a mixture of a heavy and a light liquid, e.g. methy lene iodide and benzol, allowing the latter to evaporate till the mixtur and the crystals have the same refractive index, and then determinin the refractive index of the mixture by a refractometer. H. S.

Gaudin (A. M.). *The identification of opaque solids by selective iridescen filming. I. Optics.* Journ. Physical Chem., 1937, vol. 41, pp. 811 859, 15 figs.

The theoretical aspects of the optical properties of tarnish films o sulphide minerals are discussed. [M.A. 7–282.] M. H. H.

Mukhopadhyay (B.). *On the pleochroism of sodium nitrate crystal* Zeits. Krist., 1938, vol. 100, pp. 308–315, 2 figs.

The absorption coefficients for wave-lengths between 2531 and 3346 Å were measured along the extinction-directions of the faces $(10\bar{1}1)$ o sodium nitrate crystals, whose thickness varied from 0·008 to 0·2 mm From these observations the absorption coefficients for vibrations per pendicular to and along the optic axis at the wave-length of maximu absorption (2960 Å.) were calculated to be 16,000 and 1200. H. S.

Meen (V. Ben). *Cleavage-luminescence in mica.* Univ. Toronto Studies Geol. Ser., 1938, no. 41, pp. 33–34.

Pale brown mica ($\beta = \gamma$ 1·575, 2V 13° 45′) from the magnesite min

Kilmar, Quebec, shows a bluish-white luminescence when split. The ociated magnesite and dolomite are triboluminescent when struck h a hammer: the yellow colour shown by the magnesite and reddish- nge by the dolomite enables a rough grading of the material to be de underground. A pale brown phlogopite from Buckingham, Quebec, o shows cleavage-luminescence. L. J. S.

NDALL (J. T.). *The fluorescence of compounds containing manganese.* Proc. Roy. Soc. London, Ser. A, 1939, vol. 170, pp. 272–293, 1 pl., 23 text-figs.

Of pure manganese compounds only the halides are of themselves rescent. Many other substances are fluorescent when contaminated th a small amount of manganese. The fluorescent spectra are com- red. L. J. S.

LLY (René). *Emploi de l'infra-rouge dans l'étude des minéraux.* Bull. Acad. Roy. Belgique, Cl. Sci., 1938, ser. 5, vol. 24, pp. 791–822, 12 figs.

Light from a caesium lamp after modulation by the notched periphery a rotating disk passes through a polished mineral section on the stage a polarizing microscope the eyepiece of which is replaced by a photo- tric cell or a photographic plate sensitive to infra-red radiation. e current from the photoelectric cell after amplification is measured a sensitive galvanometer. Extinction-angles, optic axial angles, &c., minerals opaque to visible but not to infra-red light may be measured. e (010) face of a prism of stibnite gives β 3·875 γ 4·137 (λ 8521 Å.), being parallel to the length of the prism, and a thickness of 5 mm. is nsparent to this radiation. Absorption measurements have been de for molybdenite cleavages 0·015 to 0·20 mm. thick; the coefficient transmission is α 0·9785. Refractive indices for molybdenite are 2·33, ω 5·57 (λ 8521 Å.), and infra-red photographs of interference- ures confirm that the mineral is uniaxial negative. Refractive indices blende and calcite are n 2·314 and ω 1·6483, ϵ 1·4824 (λ 8521 Å.). F. A. B.

Miscellaneous.

RRENS (Carl W.) & ENGELHARDT (Wolf von). *Neue Untersuchungen über die Verwitterung des Kalifeldspates.* Naturwiss., 1938, vol. 26, pp. 137–138; Chem. Erde, 1938, vol. 12, pp. 1–22, 12 figs.

Finely powdered (radius $<1\mu$ and $3–10\mu$) adularia was treated at 20° d 40° C. for long periods in a dialyser or an ultrafiltration apparatus

with various solutions (0·001*N*-H_2SO_4, p_H 3; aerated distilled wate p_H 5·8; distilled water free from CO_2, p_H 6·6; ammonia solution, p_H 11 the solution being frequently changed. SiO_2, Al_2O_3, and alkalis passe through the dialyser (and therefore not as colloids), and from the amounts the composition of the insoluble residue was calculated. Th residue remained as a film on the grains, retarding the reaction, especiall with larger grains. Its composition ranges from SiO_2 to $SiO_2 : Al_2O_3 = 5:$ depending on the size of grain and the solution used. L. J. S.

Krüger (Gerhard). *Verwitterungsversuche am Leuzit.* Chem. Erd 1939, vol. 12, pp. 236–264, 17 figs.

Finely powdered (radius $<1\mu$ and $3–10\mu$) leucite was treated at 2 and 42° C. with solutions of p_H 0–11 (*N*-H_2SO_4, 0·001*N*-H_2SO_4, distille water, CO_2-free water, ammonia solution), the solution passing co tinuously through a filtering funnel or an electro-dialyser. Wit *N*-H_2SO_4 the whole of the K and Al passed into solution, leaving residue of amorphous silica. With the weaker solvents more Al was di solved than Si, and the residue left as a film on the grains varied in co position $SiO_2 : Al_2O_3$ from 11·68 to 2·66, depending on the solvent, tim of action, and temperature. L. J. S.

Donnay (J. D. H.). *A small set of grids for the determination of no opaque minerals.* Amer. Min., 1938, vol. 23, pp. 91–100. [Cf. M.A **6**–431.]

In 254 grids, each corresponding with some character (e.g. $d<2$, H.$>$ $n<1·46$, tetragonal, red, Ag present, Ag absent, &c.), spaces are punche out where these characters apply to one or other of 450 numbere minerals. Stacking the cards in register will leave one hole correspondi to the number of the mineral to be identified. L. J. S.

Miser (H. D.) & Stevens (R. E.). *Taeniolite from Magnet Cove, Arka sas.* Amer. Min., 1938, vol. 23, pp. 104–110, 4 figs.

A mineral resembling sericite is found in large amount in veins an pockets in a quartzite-like rock (novaculite) metamorphosed by th adjacent nepheline-syenite. It has *d* 2·819, α 1·522, β and γ 1·553, 2 near 0°, negative, and X-ray pattern similar to those of muscovite an lepidolite. Analysis shows it to be the rare Li-Mg-mica tainiolit SiO_2 58·82, TiO_2 0·11, Al_2O_3 1·29, Cr_2O_3 trace, Fe_2O_3 0·40, FeO 0·2 MgO 19·18, Li_2O 3·10, Na_2O 0·64, K_2O 10·44, H_2O+ 0·59, H_2O- 0·0 F 8·56, total (less O for F) 99·85; formula, $KLiMg_2Si_4O_{10}F_2$. The structu is discussed with Si_4O_{10} in place of $AlSi_3O_{10}$ and $LiMg_2$ in place of Al_2 muscovite. L. J. S.

ASOR (Charles Alfred). *Bromyrite from Tombstone, Arizona.* Amer. Min., 1938, vol. 23, pp. 157–159.

Dark green crystals (*a o*) and scaly masses of bromyrite occur with tive silver and gold and green ferric tellurites in the oxidized zone. nalysis by R. Carrillo gave Cl 0·6, Br 38·9, I 2·6, Ag 56·7 = 98·8. It has obably been derived from hessite, also found in the district.

L. J. S.

RASER (Donald M.) & BUTLER (Robert D.), with morphological description by HURLBUT (Cornelius S., *Jr.*). *Prehnite from Coopersburg, Pennsylvania.* Amer. Min., 1938, vol. 23, pp. 583–587, 5 figs.

Fan-shaped groups of tabular crystals in a vein in Triassic diabase ow eight crystal-forms, including new *p* (221) and *t* (012) [$a:b:c$ = 42:1:3·357; M.A. **5**–186]. Optic axial plane (010), $\alpha = a$, α 1·612, 1·618, γ 1·642, 2V 64°, positive. Analysis gave SiO_2 42·38, Al_2O_3 ·41, Fe_2O_3 1·20, CaO 27·90, H_2O 4·10 = 99·99. L. J. S.

ACDONALD (G. A.) & MERRIAM (Richard). *Andalusite in pegmatite from Fresno County, California.* Amer. Min., 1938, vol. 23, pp. 588–594, 4 figs.

Radiating masses, up to 10×15 cm., of andalusite enclose grains of rundum and are surrounded by a rim of sericite. Analysis of pale pink aterial ($r<v$ weak) gave I, and of dark reddish-violet ($r<v$ very strong) ve II. The mineral is supposed to be of pneumatolytic origin and later tered by hydrothermal action.

	SiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	H_2O.	Sp. gr.	α.	β.	γ.	2V.
.	35·61	62·40	0·51	0·60	0·73	3·13	1·634	1·639	1·645	86°
I.	35·46	60·84	2·44	0·42	0·50	3·16	1·637	1·641	1·646	75°

L. J. S.

AY (J. W. J.), GLÜCKAUF (E.), & PANETH (F. A.). *On the occurrence of helium in beryls.* Proc. Roy. Soc. London, Ser. A, 1938, vol. 165, pp. 238–246.

Since no appreciable amount of helium can be detected in metallic eryllium, it is suggested that in beryl the He must have been derived om some other element than Be. [M.A. **5**–477, **6**–498.] L. J. S.

AYLEIGH (*Lord*). *Neon and argon in the earth's crust.* Nature, London, 1938, vol. 141, p. 410.

— *Nitrogen and argon in the earth's crust.* Ibid., p. 970.

— *Nitrogen, argon and neon in the earth's crust with applications to*

cosmology. Proc. Roy. Soc. London, Ser. A, 1939, vol. 170, pp. 451–463, 3 figs.

In various igneous rocks were found about 2×10^{-5} c.c. of argon 8×10^{-8} c.c. neon, and 0·04 c.c. nitrogen, per gram of rock. The Ne/A ratio is about the same as in the atmosphere. The nitrogen appears to be chemically combined, and its total amount is some 50 times as much as in the atmosphere. The data here quoted are from the later paper.

L. J. S.

Holzner (Julius). *Beiträge zur Kenntnis der varistischen Gesteins- und Mineralprovinz im Lahn-Dillgebiet. 7. Eisenchlorite aus dem Lahngebiet; chemische Formel und Valenzausgleich bei den Eisenchloriten.* Neues Jahrb. Min., Abt. A, 1938, Beil.-Bd. 73, pp. 389–418, 2 pls., 1 text-fig. [M.A. **5**–286.]

Five new chemical analyses with sp. gr. and optical data are given of aphrosiderite and thuringite. Calculating all iron as Fe″, they agree with Tschermak's At-Sp mixtures. Of previously published analyses of iron-chlorites some agree with At-Sp mixtures, while others agree with the chlorite formula when it is assumed that Fe‴O replaces Fe″OH. [Cf. Min. Mag. **25**-452, 458.]

L. J. S.

Slavík (František). *O kašolongu z Olomučan, Rudic a. j.* [On the cacholong from Olomučany, Rudice, &c.] Časopis Vlasteneckého Musejního Spolku v Olomouci, 1937, vol. 50, pp. 24–29, 1 fig. (Czech with French résumé.)

The cacholong in quartz geodes in Jurassic sediments at these localities, north of Brno, was described by Blum and Sandberger as opal, but it is typical chalcedony with 'enroulements'. Similar material also occurs in Permian melaphyres at several places in northern Bohemia.

F. S.

Ulrich (František). *Houby jako rozrušovatelé a tvůrci nerostů a hornin.* [Fungi as destructive and constructive agents of minerals and rocks.] Věda Přírodní, Praha, 1938, vol. 19, pp. 45–50, 4 figs.

The lublinite variety of calcite is, at many localities, of biogenetic origin. The fibres of various hyphomycetes determine the crystallization and structure of calcium carbonate. Such deposits of 'rock-milk' are of frequent occurrence on Cretaceous rocks in northern Bohemia and western Moravia, and on travertine in Slovakia.

F. S.

Saparová (Jiskra) [formerly Jiskra Londýnová]. *Křemen od Vernířovic na severní Moravě.* [Quartz from Vernířovice = Wermsdorf in

northern Moravia.] Časopis Zemského Musea v Brně, 1938, vol. 30, 32 pp., 3 pls. (Czech with German summary.)

)f the 30 crystals measured 19 are twinned, one on the Brazil law ll the others on the Dauphiné. They are rich in forms, 69 trapezo- dra, 3 trigonal bipyramids, 18 rhombohedra, and the prism (10$\bar{1}$0) ng noted, many of them vicinal. New forms are the trapezohedra: .10.23.10) right, (11.4.7.4) left, (14.5.9.5) l., (85.8.93.5) r., (93.8.85.5) observed on several crystals; the complementary (7.4.11.4) r. and .8.85.5) l., found only once but as well-developed faces; (11.5.6.5) l., .7.9.7) l., and (7343) l., complementary to forms already known. e prism (10$\bar{1}$0) is often replaced by vicinal rhombohedra. F. S.

NOTA (Ladislav) & KRAUS (S.). *Nerost skupiny domeykitové z Bělovsi u Náchoda.* [A mineral of the domeykite group from Běloves near Náchod.] Věda Přírodní, Praha, 1938, vol. 19, p. 152.

uprite, olivenite, and tyrolite have been previously recorded from locality in Bohemia. A metallic silver-grey mineral disseminated masses of cuprite was found to contain Cu 73·21 % together with enic. F. S.

VÁČEK (Radim). *The identity of dakeite and schroeckingerite.* Amer. Min., 1939, vol. 24, pp. 317–323, 6 figs.

X-ray powder photographs, dehydration curves, optical and micro- mical tests show that schröckingerite from Jáchymov (Joachimstal), hemia, is identical with dakeite [M.A. **6**–488] from Wyoming. Data en in Larsen's tables fit β-uranotile, not schröckingerite. Six-sided les of the latter mineral yield prism angles of 60°, but other workers d angles which differ by 2°. The problem of the true symmetry could be settled by Laue photographs owing to sub-parallel alinement of platy crystals. F. A. B.

EINOCHER (V.) & NOVÁČEK (R.). *On β-uranotile.* Amer. Min., 1939, vol. 24, pp. 324–338, 7 figs.

Microchemical analyses and optical data show that wrongly labelled röckingerites from (II) Bedford, New York; (III) Spruce Pine, tchell Co., North Carolina; and (IV) Wölsendorf, Bavaria, are the ne species as β-uranotile [M.A. **6**–149] from (I) Jáchymov (Joachims-), Bohemia. Detailed optical data for material from all these locali- s are given for three different wave-lengths (using filters). The refrac- e indices have been measured with the Leitz hemisphere and universal ge. β-uranotile from Jáchymov, but not elsewhere, shows zoning, st viewed on the tabular (010) plane. The refraction and birefringence

increase from the centre of the crystal outwards whilst the extinctio angle $\gamma : c$ decreases.

	α_D.	β_D.	γ_D.	2V (negative).	$\gamma_D : c$.	Sp.
I	1·661–1·671	1·682–1·694	1·689–1·702	71½°	52–57° 44–48°	3·9
II	1·658	1·682	1·685	40–45°	35–37½°	—
III ...	1·663	1·688	1·697	62°	32½°	3·8
IV	1·668	1·686	1·695	—	36°	3·8

When β-uranotile from Wölsendorf is crushed, small acicular fragmen are formed which correspond in extinction and refraction to norm uranotile. F. A. B.

Thilo (Erich). *Chemische Untersuchungen von Silikaten, VII. Üb das bei der thermischen Zersetzung von Talk entstehende Magnesiu metasilikat.* Ber. Deutsch. Chem. Gesell., Abt. B, 1937, vol. 7 pp. 2373–2381.

By ignition of a mixture of MgO and SiO_2 at 1250° C., olivine was fir formed, and then metatalc, $MgSiO_3$, which was also obtained by ign tion of talc at 950° C. Attempts to convert enstatite or clinoenstati into metatalc failed. Metatalc was converted into enstatite at 790° C. presence of LiF. An analysis of olivine from Dockweiler is given. M. H. H.

Thilo (Erich) & Rogge (Gerhard). *Chemische Untersuchungen vo Silikaten, VIII. Mitteil. Über die thermische Umwandlung d Anthophyllits $Mg_7Si_8O_{22}(OH)_2$. Über die Polymorphie des Ma nesiummetasilikates und über den Mechanismus der Umwandlung vo Anthophyllit und Talk beim Erhitzen.* Ber. Deutsch. Chem. Gesel Abt. B, 1939, vol. 72, pp. 341–362, 8 figs.

Thilo (Erich). *Strukturchemische Untersuchungen über Magnesiu silikate.* Forschungen und Fortschritte, 1939, vol. 15, pp. 170–17 2 figs.

Dehydration curves and X-ray powder photographs show that anth phyllite breaks down to enstatite when heated to 900°: $Mg_7Si_8O_{22}(OH$ $\rightarrow 7MgSiO_3 + SiO_2 + H_2O$. On further heating this is transformed mesoenstatite and then to clinoenstatite, these being enantiotrop modifications stable between certain temperature limits: enstatite mesoenstatite (900°) $\rightleftharpoons$ clinoenstatite (1270°). Talc at 900° breal down to MgO and SiO_2, which on long heating at 900° give a met stable modification (M_1) of $MgSiO_3$ and at 1020° another metastab modification (M_2). L. J. S.

LO (Erich). *Chemische Untersuchungen von Silikaten. IX. Die Umwandlung von Tremolit in Diopsid beim Erhitzen.* Zeits. Krist., 1939, vol. 101, pp. 345–350, 1 fig.

remolite when heated to 900° C. undergoes a change into a double of diopside and $MgSiO_3$ together with free silicic acid. Powder ay observation shows that the change is similar to that which takes e when anthophyllite is converted into enstatite and silicic acid on ting [preceding abstract]. The Si–O double chain of the tremolite sists in the single Si–O chain of the double salt. The free silicic acid ristobalite whose crystalline particles have no definite arrangement.

H. S.

RADA (Zyunpéi). *Über die optischen Eigenschaften der japanischen Datolithe.* (*Studien über japanische Bormineralien, VI*). Journ. Fac. Sci. Hokkaido Univ., Ser. 4, 1939, vol. 4, pp. 475–485, 7 figs.

Detailed optical measurements in light of several wave-lengths are en for datolite. From Noborio, Miyazaki prefecture, α 1·6259, ·6535, γ 1·6999, 2V 74° 8′; from Hol-Kol, Suan, Korea, α 1·6261, ·6537, γ 1·6701, 2V 74° 7′ (for sodium-light). L. J. S.

RADA (Zyunpéi). *Beiträge zur Kenntnis des Turmalins von Japan.* (*Studien über japanische Bormineralien, VII*). Journ. Fac. Sci. Hokkaido Univ., Ser. 4, 1939, vol. 4, pp. 487–500, 8 figs.

Tourmaline occurs in granite, pegmatite, aplite, ore and quartz veins, ntact zones, and metamorphic rocks, but rarely in basic rocks (amphiite and serpentine). Dark brown crystals in serpentine from Sekizen nes, Ehimé prefecture, gave I, corresponding to (Ca,Na,K)(Al,Ti, ,Mg)$_9$B$_3$Si$_6$H$_3$O$_{31}$, with 77 mol. % dravite. Zoned crystals in granite m Kurobira, Yamanasi prefecture, are dark bluish inside (anal. II*a*) d greenish-brown outside (II*b*), agreeing with the same formula, with mol. % schorl. Refractive indices of black tourmaline from various ks and several localities range ω 1·651–1·679, ϵ 1·624–1·651, $\omega-\epsilon$ 24–0·030, indicating 20–80 mol. % schorl in the dravite-schorl series.

	SiO_2.	TiO_2.	B_2O_3.	Al_2O_3.	Fe_2O_3.	FeO.	MnO.	MgO.	CaO.
...	37·42	0·82	8·98	29·48	2·08	3·59	0·03	10·29	1·28
...	35·10	0·33	9·38	34·07	0·56	14·37	0·10	1·45	0·46
...	35·19	0·23	9·25	34·15	5·66	9·91	0·13	1·46	0·33

	Na_2O.	K_2O.	H_2O+.	H_2O-.	Total.	Sp. gr.	ω.	ϵ.
...	3·09	0·12	2·40	0·38	'99·94'	3·078	1·645	1·617
...	2·15	trace	1·95	0·30	100·23	—	1·668	1·638
...	2·09	—	1·90	0·26	100·62	—	1·670	1·641

L. J. S.

Harada (Zyunpéi). *Optische Untersuchungen der japanischen Axini (Studien über japanische Bormineralien, VIII).* Journ. Fac. S Hokkaido Univ., Ser. 4, 1939, vol. 4, pp. 501–505, 2 figs.

Axinite from different localities at granite-limestone metamorph contacts has α 1·677–1·683, β 1·684–1·690, γ 1·688–1·695, and fro hydrothermal veins of manganese ore the lower values α 1·672–1·67 β 1·677–1·680, γ 1·681–1·684. This variation evidently corresponds the content of iron and manganese. There are also differences in t optical orientation; and between crossed nicols the crystals show zonal structure. L. J. S.

Yosimura (Toyohumi) [formerly Toyofumi Yoshimura]. *Caledon and leadhillite from the Toroku mine, Miyazaki pref., Japan.* Jou Fac. Sci. Hokkaido Univ., Ser. 4, 1939, vol. 4, pp. 453–463, 10 fi

The crystals described were from a single drusy cavity. Caledoni shows the forms *c b e m* with smaller *r x* δ *s t* (Dana's letters) and n (225). The habit of the crystals and their optical orientation confo with orthorhombic symmetry, but some of the angular measureme suggest monoclinic symmetry, and the axes are tentatively given $a:b:c = 0{\cdot}9028:1:1{\cdot}4033$, β 89° 28′. Sp. gr. 6·13, H. $3\frac{1}{2}$, $\alpha = a$, $\beta =$ $\gamma = c$, α_D 1·820, 2V very large. The mean of two analyses, SO_3 12·4 CO_2 3·29, PbO 66·69, Cu 9·07, H_2O 3·34, As_2O_5 trace, insol. 0·20 = 95·(gives $Pb_8Cu_3(SO_4)_4(CO_3)_2(OH)_{10}$. Leadhillite shows the forms *c m o w d g x* (Dana's letters) and (011), (437), ($\bar{3}38$). Sp. gr. 6·62, H. Analysis of impure crystals (12·45 % deducted), SO_3 6·95, CO_2 11·3 PbO 76·62, CuO 2·94, H_2O 2·19 = 100·00, gives $Pb_{17}Cu_2(SO_4)_5(CO_3)$ $2Pb(OH)_2.4H_2O$. Cerussite shows the forms *c i b m o s y p w r* sp. gr. 6·78, α 1·807; analysis gave CO_2 16·2, PbO 82·5. Mimetite sulphur-yellow crystals on leadhillite. L. J. S.

Yosimura (Toyohumi) [formerly Toyofumi Yoshimura]. *Studies the minerals from the manganese deposit of the Kaso mine, Jap* Journ. Fac. Sci. Hokkaido Univ., Ser. 4, 1939, vol. 4, pp. 313–4 19 pls., 13 text-figs.

The vein fills a fault-fissure between slate and quartzite, which intruded by diabase dikes. The ore-minerals are rhodochrosite, rho nite, tephroite, &c. Three stages in the mineralization and me morphism are distinguished, and the genetic relations of the miner are discussed. Descriptions are given of 85 minerals, for 57 of wh chemical analyses with sp. gr. and optical data are given. Bariu felspars, including the new kasoite [M.A. **6**–489], gave:

	α.	β.	γ.	2V.	Sp. gr.
alophane, $Cn_{23\cdot5}(Or,Ab)_{62\cdot0}(Ne,Kp)_{14\cdot5}$	1·538	1·542	1·546	$75\frac{1}{2}°(-)$	2·78
,, $Cn_{23\cdot6}Or_{58\cdot5}Ab_{17\cdot9}$	1·539	1·543	1·547	$75\frac{1}{2}(-)$	—
,, $Cn_{18\cdot5}Or_{69\cdot8}Ab_{11\cdot7}$	1·538	1·542	1·544	75(−)	2·78
soite, $Cn_{49\cdot6}Ab_{8\cdot5}Ne_{9\cdot4}Kp_{32\cdot5}$	1·564	1·568	1·572	$80\frac{1}{2}(-)$	3·003
sian, Cn_{74} (Ne,Kp)$_{26}$	1·579	1·583	1·586	86(+)	—
rium-albite, $Cn_{14}Ab_{44}Or_{42}$	1·532	1·538		—	—

Several analyses are given of carbonates, (Mn,Fe,Mg,Ca)CO_3, spessartine, tephroites, pyroxenes (including rhodonite), amphiboles, and micas. Marmatite, as steel-black crystals, gave ZnS 57·0, FeS 43·0 %, sp. gr. 3·80. Other minerals include alleghanyite, bementite, manganophyllite, penwithite, &c. L. J. S.

MOTTE (A.). *Sur la présence de sulvanite (sulfure de cuivre et de vanadium) au Katanga méridional.* Bull. Soc. Belge Géol., 1939, vol. 48 (for 1938), pp. 500–504, 1 fig.

Sulvanite as grains and apparently cubic crystals, often coated with malachite, occurs with chalcopyrite in white crystalline dolomite in the Kafunfu valley, a tributary of the Haut-Lualaba. Analysis gave Cu 46·28, S 32·15, V 13·17, SiO_2 7·52, Fe, Ca, Mg traces. L. J. S.

STALL (R. H.). *On brookite crystals in the Dogger.* Geol. Mag. London, 1938, vol. 75, pp. 433–440, 4 figs.

Minute crystals of different habits—flattened on (100) with elongation along the *c*- or *b*-axes, or flattened on (001) with *b*-axis elongation—may be found together in the same rock in the Jurassic beds of NE. Yorkshire. One rare type (flattened on (100) with *b*-axis elongation) does not show crossed axial dispersion, but has the optic axial plane for all colours parallel to (001) with $r>v$. Some of the very fragile crystals must be authigenic, while others appear to have been derived. [Min. Mag., **14**–96, **23**–126.] L. J. S.

STALL (R. H.). *On rutile from the Dogger.* Geol. Mag. London, 1939, vol. 76, pp. 109–115, 2 figs.

Minute (<0·2 mm.) crystals of rutile, always worn and evidently derived, occur with anatase and brookite in Jurassic beds in NE. Yorkshire. They range in colour from yellow to brown and red, rarely colourless or greenish; and are twinned on (101) and (301). L. J. S.

TTERFIELD (J. A.). *Brookite in the Millstone Grit of Yorkshire.* Geol. Mag. London, 1939, vol. 76, pp. 220–228, 3 figs.

Titanium minerals (ilmenite, leucoxene, rutile, anatase, brookite, and

sphene) form 24–55 % of the heavy residue of this rock. Several type of brookite crystals are described. They are all small (0·05–0·1 mm and authigenic. L. J. S.

Pough (Frederick H.). *Crystallized dolomite in Staten Island serpentin* Proc. Staten Island Inst. Arts Sci., [1939?], vol. 8 (for 1937–38 pp. 121–128, 6 figs.

Prismatic crystals of dolomite are embedded in white marmolit (n 1·553) filling fissures in serpentine. The smaller crystals show th forms a r, while larger ones (up to 2½ mm. long) show only a c. Asso ciated are minute octahedra of magnetite and hexagonal plates o nepouite (n 1·603). Four generations of serpentine are distinguished. L. J. S.

Mackowsky (Marie-Therese). *Zusammenhänge zwischen Optik un Chemismus der Granate in den Systemen Grossular-Melanit un Melanit-Titanmelanit.* Inaug.-Diss., Bonn, 1938, 69 pp., 25 fig [M.A. **7**–366.]

Carobbi (Guido). *Considerazioni sulla costituzione dei pirosseni contenen elementi trivalenti.* Atti e Mem. R. Accad. Sci. Modena, 1937, ser. vol. 2, pp. 176–193.

The relation between enstatite and diaspore suggests that they ma form solid solutions. Similarly, gibbsite and monoclinic pyroxenes ma perhaps form solid solutions. L. J. S.

Volk (W. Garth). *Optical and chemical studies of muscovite.* Amer. Mi 1939, vol. 24, pp. 255–266, 2 figs.

Twenty-two new chemical analyses, refractive index, dispersion, an optic axial angle determinations are given for specimens of muscovi from American localities. The variations in composition and correlatio with optical data are interpreted with reference to three so-called en members: potassium muscovite, $H_4K_2Al_6Si_6O_{24}$; phengite, $H_6K_2(Fe$ $Mg)_2Al_4Si_6O_{24}$; and ferric iron muscovite, $H_4K_2Fe'''_2Al_4Si_6O_{24}$.

[No specific gravities or X-ray data are given.] F. A. B.

Webb (Robert W.). *Large sphene crystals from San Jacinto Mountain California.* Amer. Min., 1939, vol. 24, pp. 344–346, 2 figs.

The top-soil on the country-rock, a granodiorite, carries numero sphene crystals up to $\frac{1}{2}\times\frac{1}{2}\times 1$ inch in size. Forms present are a c x [Dana's letters]. F. A. B.